3 Access and Travel Patterns

This chapter discusses access and travel patterns in each of the Carson NF's ranger districts (RDs). The analysis describes major traffic routes, major infrastructure improvements, and forest roads and trails. Finally, issues concerning travel management, namely the use of off-highway vehicles (OHVs) is considered.

The analysis is based solely on secondary data. Most information came from the New Mexico Department of Transportation (NMDOT) and the Highway Performance Monitoring System (HPMS), maintained by the Federal Highway Administration (FHWA). Online access of HPMS data is available from the Bureau of Transportation Statistics.[38]

3.1 Location of Major Transportation Routes

This section describes the transportation patterns typical of visitors or others traveling to and from the forest. Few major roadways travel through the Carson NF. These roadways also comprise the Enchanted Circle Scenic Byway. The byway loops around NM522, NM38 and NM64. Heading north from Taos, one can take NM522 to NM38 east/south to NM64 south/west back to Taos. An alternate route of the circle travels further through the Sangre de Cristo Mountains into the Valle Vidal area. The byway attracts visitors who come to enjoy the tremendous landscapes and views typical of northern New Mexico. **Figure 3.1** provides an illustration of the major transportation routes and airports in the area. **Table 3.1** lists the major roadways surrounding the Carson NF.

US64 cuts across (east-west) the southern portion of the Tres Piedras RD. FS Road 87 provides access to the Cruces Basin Wilderness area and other recreational sites in the northern part of the district. The Tres Piedras RD has the most miles of FS road with 1,151 miles, most of which are "native material." However, native material surfaces are generally impassible in inclement weather. Taos is the closest city to the Tres Piedras RD and Santa Fe is the largest city in the northern New Mexico area, located 90 miles from Tres Piedras. A small regional airport is located 10 miles to the west of Taos, with limited service to Santa Fe and Albuquerque. However, the airport in Albuquerque is most commonly used to enter and leave New Mexico. This major airport is approximately a two and a half hour drive from the village of Tres Piedras.

[38] Bureau of Transportation Statistics, "Highway Performance Monitoring System - Core Data," Bureau of Transportation Statistics, http://www.transtats.bts.gov.

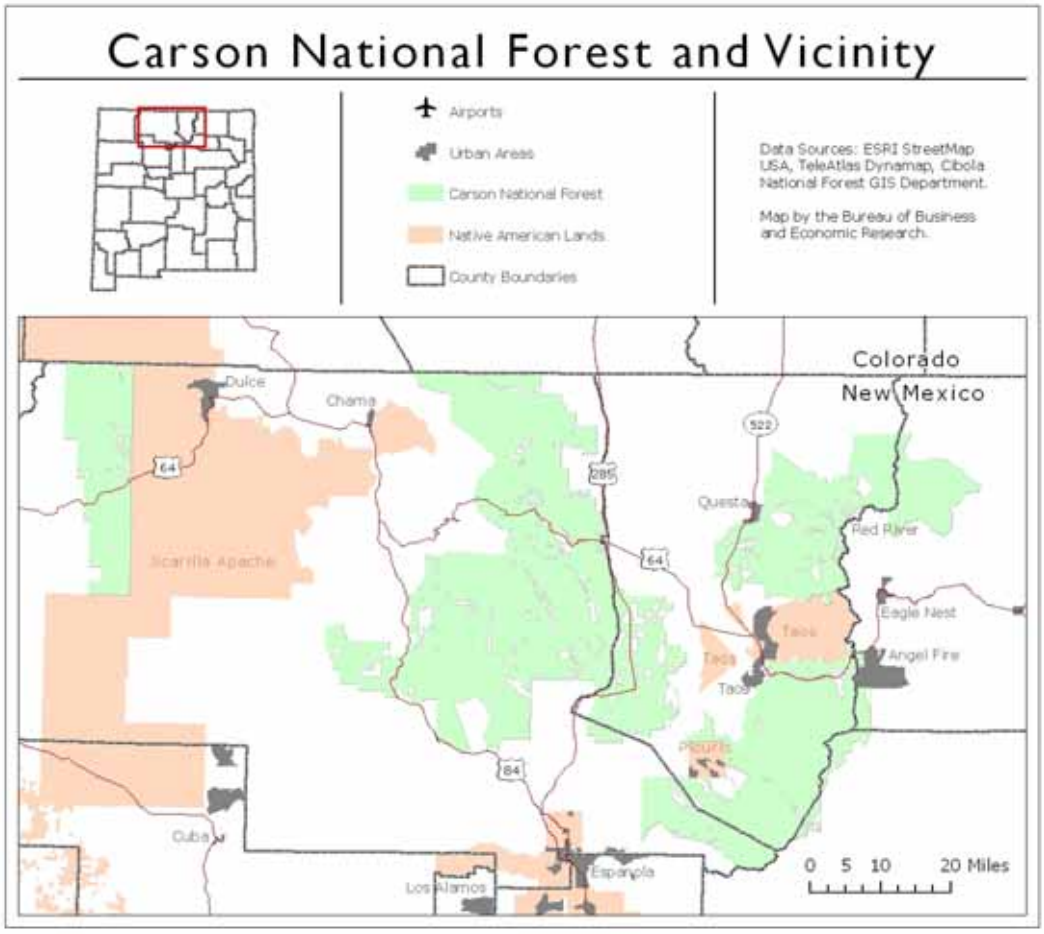

Figure 3.1: Map of Principal Highways in Region

The Questa RD is served mainly by NM522 and NM38. NM522 connects Taos and Questa, traveling through Arroyo Hondo and El Prado. NM 522 is the western section of the Enchanted Circle Scenic Byway and connects to NM38 in Questa. NM38 goes from Questa east to Bobcat Pass down through the Beaubin and Miranda Grant through Eagle Nest. This road makes up the northern and eastern section of the Enchanted Circle Scenic Byway. Just north of Questa, NM378 leads west through Cerro to the Rio Grande Wild River recreation area, home of the Rio Grande Gorge.

NM563 provides access to areas in the Latir Wilderness. It begins near Questa and leads northeast and becomes Forest Road 134 when it crosses into public land. The Valle Vidal Unit, surrounded by the Beaubin and Miranda Grant, is accessed with FS Road 150, which runs through the Valle Vidal Unit as the main east-west route. In the Valle Vidal Unit, FS Road 1910 starts near Cimarron campground and leads south.[39] The Valle Vidal Unit is discussed in a greater detail in Chapter 6.3.

[39] Other FS roads in the Valle Vidal Unit include: 1900, 1913, 1914, 1916 and 1950.

Table 3.1: Roadways Around The Carson NF

	Tres Piedras	Canjilon	El Rito	Questa	Camino Real	Jicarilla
US Route	US 84	US 64	US 64	US 64	US 64	US 64
	US 64	US 84	US 84			
	US 285		US 285			
State Road	NM 111	NM 96	NM 96	NM 38	NM 68	NM 527
	NM 519	NM 111	NM 111	NM 58	NM 75	NM 537
	NM 522	NM 554	NM 554	NM 68	NM 76	US 595
	NM 576			NM 552	NM 434	
					NM 518	
					NM 522	
					NM 567	

The Taos Ski Valley, a major attraction in the area, is nestled in the Wheeler Peak Wilderness and can be accessed via NM150. NM150 connects Taos Ski Valley to Arroyo Seco, traveling through Wheeler Peak Wilderness. This road can be accessed via NM64. Continuing west, this road connects to NM522 in Arroyo Hondo. Access to Wheeler Peak Wilderness is also provided by NM578, which runs from Red River past Fourth of July Canyon into the wilderness area.

The Camino Real RD, which is south of the Questa RD, is served by two major roadways (NM518 and US64) and several FS roads. NM518 runs southeast from Ranchos de Taos, through Santa Barbara (Sipapu and Tres Ritos) and continues through the Mora Land Grant into Las Vegas, NM. This road provides access to the Pot Creek Cultural Site near an area where it connects to Forest Roads 438, 439 and 476. US64 runs through the northern section of the RD, providing access to the El Nogal, Las Petacas, Capulin and La Sombra recreation sites. Another thoroughfare is NM 76, which connects Picuris Pueblo to Truchas, Chimayo and Española. This road goes through the Las Trampas Grant area of the RD.

The El Rito RD is served by two state roads and almost 900 miles of FS roads. NM111 travels through the district connecting US64 to NM554 and US285. NM554 runs into the town of El Rito. NM519 also runs through the district, connecting Las Tablas to NM111 near La Madera. Both NM519[40] and NM111 are designated as FS roads at various points along their routes through the RD.

Access to the Canjilon RD is via US84. The small community of Canjilon is located about 50 miles south of Pagosa Springs, Colorado and about 50 miles north of Española, New Mexico. US 84 runs along the southern perimeter of the Canjilon RD and is the southwestern leg of the Enchanted Circle Scenic Byway. NM 115 runs from US84 into the small town of Canjilon and then becomes FS Roads 137 and 559. FS Road 559 provides access to the Middle Canjilon Lakes, a popular fishing destination for Rainbow and Cutthroat Trout. FS Road 137 runs from the town of Canjilon southeast through Rincon Amarillo and connects with NM554 south of El Rito. About 35 miles away is the historic village of Chama which serves as the closest full-service community to Canjilon.

The only major roadway traveling through the Jicarilla RD is US64, which cuts through the area east-west. There are 478 miles of forest roads in the area providing access to various oil and gas

[40] NM519 changes to Forest Road 222 and connects to US285 near Tres Piedras, NM.

development sites. The forest roads are maintained by the FS as well as by many of the oil and gas companies leasing land in the area.

To help put the Forest in context; **Table 3.1** summarizes the principal roadways around the Carson NF. **Table 3.2** shows the distance of each RD to the major metropolitan statistical areas (MSAs) in the southwestern region of the United States. The Carson NF is isolated from other MSAs in the region and is situated in one of the least populated areas of New Mexico. The major population bases within reasonable driving distance are Albuquerque and Santa Fe. However many forest visitors and local residents come from smaller communities in the area. Many of the cities listed below have NF options that are closer than the Carson NF (the Santa Fe and Cibola National Forests, for instance), thus the Carson NF may not be the first choice for travelers.

Table 3.2: Distance from Major Cities to The Carson NF Ranger Districts

City	Tres Piedras	Canjilon	El Rito	Questa	Camino Real	Jicarilla
Albuquerque, NM	143	138	164	156	133	156
Amarillo, TX	361	356	314	306	291	442
Denver, CO	434	345	260	266	338	371
El Paso, TX	408	403	429	421	397	475
Farmington, NM	173	142	223	208	215	53
Las Cruces, NM	364	359	385	378	354	431
Lubbock, TX	394	389	380	373	324	475
Phoenix, AZ	606	601	627	620	596	500
Pueblo, CO	181	231	146	151	223	257
Roswell, NM	273	268	294	287	252	354
Santa Fe, NM	81	76	102	95	71	162
Tempe, AZ	620	615	641	633	609	514
Tucson, AZ	645	640	667	659	635	505

Source: http://www.mapquest.com

The Sonoran Institute found that the longer the drive between public lands and the nearest metropolitan area, the lower the potential for economic growth (particularly personal income).[41] Public lands that are far away from metropolitan areas do not get as many visitors as public lands near metropolitan areas like the Sandia RD in the Cibola NF, for instance, which is near Albuquerque, NM. In other words, forest areas that are isolated from major population bases are less likely to generate significant economic activity.

Table 3.3 shows lane miles in each county in the assessment area by road classification. Urban and rural road miles are the number of miles in urban and rural areas. NMDOT defines rural areas to be areas where the population is under 5,000 persons. Any area with more than 5,000 persons is defined as an urban area.[42] In all four counties there are only 165 miles of urban road and over 12,000 miles of rural road Rio Arriba County has the most miles of both urban and rural road (7,917) and Mora County has the least (1,136).

[41] R. Rasker, B. Alexander, J. van den Noort, and R. Carter. (2004). Prosperity in the 21st Century WEST. The Sonoron Institute.

[42] Bureau of Transportation Statistics, http://www.transtats.bts.gov/Tableinfo.asp?Table_ID=1102.

Table 3.3: Lane Miles of Road by County and Classification

Rural					
		Other Principal			
County	Interstate	Arterial	Minor Arterial	Collector & Local	County Total
Colfax	208	65	233	1,791	2,297
Mora	154	0	0	982	1,136
Rio Arriba	0	84	490	7,254	7,828
Taos	0	112	227	1,047	1,386
Total	362	261	950	11,074	12,648
Urban					
		Other Principal			
County	Interstate	Arterial	Minor Arterial	Collector & Local	County Total
Colfax	24	20	7	14	64
Mora	0	0	0	0	0
Rio Arriba	0	11	14	64	89
Taos	0	0	0	11	11
Total	24	31	22	89	165

Source: US Department of Transportation HPMS Database

Most roads in the assessment area are collector and local roads. According to the NM DOT Strategic Plan, the primary function of collector and local roads is to provide access to homes and businesses. In contrast, the function of interstate and arterial roads is to move people and goods efficiently. The roads near the Carson NF are not designed to handle heavy loads of traffic.

3.2 Airports

The Albuquerque International Sunport in Albuquerque, New Mexico is the largest and most-traveled airport in the state. Roughly six million travelers go through the airport per year.[43] However, this airport is more than one hundred miles away from any part of the Carson NF. Figure 3.1 showed no major airports in the vicinity of the Carson NF.

The nearest municipal airports to the El Rito RD are in Taos (~60 miles northeast) and Santa Fe (~60 miles south). Again, however, the largest and most traveled airport in the area is in Albuquerque, about 130 miles south. The closest airport to the Jicarilla RD is in Farmington, NM about 20 miles west[44]. The airport has daily commuter flights to Santa Fe, Albuquerque and other New Mexico cities.

Research conducted by the Sonoran Institute found that rural counties that are within an hour's drive of a mid-sized airport reap more economic benefits from public lands, since visitors will have more convenient access to the area. [45] A mid-sized airport (also called a Category I Airport) has between two and 20 million travelers per year and typically has no international flights.

[43] City of Albuquerque, "Albuquerque International Sunport," http://www.cabq.gov/airport/.
[44] Farmington Airport is 20 miles from the Forest District Office (Mt. Taylor RD), but may be further from forest lands, depending on reference point.
[45] R. Rasker, B. Alexander, J. van den Noort, and R. Carter. (2004). Prosperity in the 21st Century WEST. The Sonoron Institute.

Airports that have the most influence are those with daily commercial flights to major hubs, and more than 25,000 passengers a year. Besides the Albuquerque airport, the only other airport that comes close is in Santa Fe. Santa Fe municipal airport is serviced by commuter airlines as well as being open to private aircraft.

3.3 Traffic Flows

Table 3.4 shows estimated daily vehicle miles traveled (VMT) and VMT per lane mile by county for all counties in the assessment area. VMTs are calculated by multiplying the Average Annual Daily Traffic (AADT)[46] by road length in an area. VMT per lane-mile offers a useful measure of the intensity of road traffic, and is highly correlated with population density. The measure is also useful to compare traffic density among geographical areas.

Table 3.4: Daily Vehicle Miles Traveled

County	Estimated VMT	VMT per Lane-Mile
Colfax	673,508	285
Mora	387,063	341
Rio Arriba	1,251,928	158
Taos	712,677	510

Note: VMT is calculated as AADT*Section_Length

Source: US Department of Transportation (2001), HPMS Database, Calculated by UNM-BBER

Populations in the assessment area are quite small, so it is no surprise that traffic in the area is very light, especially in Rio Arriba and Colfax Counties. Given its high number of road miles, Rio Arriba County has the lightest traffic, with about 158 vehicles traveling any given stretch of road on a typical day. Taos County had the heaviest traffic in the assessment area, but it is still quite low relative to the rest of the state. In comparison, the 2001 VMT for Bernalillo County was 11.9 million with a VMT per lane mile of over 2,000.

Capital Outlays and Transportation Infrastructure Improvements

As part of Governor Richardson's Investment Program (GRIP), monies have been programmed for transportation infrastructure improvements throughout northern New Mexico. Many of the projects are along US64 and US84, both of which are major access routes running between Taos, Española and Tierra Amarilla. Below is a brief description of GRIP projects around the Carson NF.[47]

US 64, Rio Arriba County Line - E. to US 84 ($23.1 million)

The project includes reconstruction and shoulder widening of various sections along 20 miles of roadway. Improvements include bridge replacement, drainage structure replacement and pavement replacement. This route serves as the primary route for

[46] The daily flow of motor traffic is averaged out over the year to give an AADT, a useful and simple measurement of how busy the road is.

[47] Information and descriptions obtained from the NMDOT Strategic Plan 2004-2005.

tourism to Chama and Pagosa Springs from US550 and Dulce. The bridge joints are non-functioning with advanced section loss throughout. There is up to 20 ft of exposed rebar on several girders. In progress, ends December 2010.

US 84, Pojoaque to Española ($30.5 million)

Four lane new construction of an alternate route to bypass Española, reconstruction of US84 at tie-ins to relief route .Began February 2006

US 56, Springer East to Abbott ($11.5 million)

Enhanced two lane proposal is to resurface, restore and rehabilitate existing lanes with widened shoulders with some isolated areas of full reconstruction due to base failures. This section of US56 is a major travel route to and from Texas and Oklahoma to the recreational areas of northern New Mexico, began in June 2006.

US 64, West of Dulce ($9.6 million)

MP115 to MP125, this section of US64 lies between the towns of Blanco and Dulce. 2-lane reconstruction and rehabilitation; the existing pavement shows signs of base and subgrade failure with moderate to major pavement deterioration, so a two lane rehabilitation and reconstruction is planned.

US84 Romeroville South ($11.5 million)

Enhanced two lane proposal is to resurface, restore and rehabilitate the existing lanes with the addition of shoulders and drainage improvements. This route is a major connection between I-40 at Santa Rosa and I-25 near Las Vegas and carries a high volume of commercial traffic.

Outside of the GRIP projects, there are over 100 projects taking place in the assessment area; all working toward improving transportation infrastructure in the region. For example, a $10 million reconstruction project will improve road conditions on US64 between the Rio Arriba County line and the US84 junction. A similar project is taking place on US84 between Echo Amphitheater and the small town of Cebolla. US84 is a major access route connecting Española to Tierra Amarilla. US64 between Taos and Tres Piedras is slated for a $4.6 million road resurfacing, reconstruction and rehabilitation project to be completed in 2009. This section connects the Tres Piedras RD to the Camino Real RD. The Rio Grande Gorge Bridge (US84) is also due for a $2 million bridge rehabilitation in 2007. For an exhaustive list of capital improvement projects in the assessment area, refer to **Table A.3** in the appendix.

3.4 Forest Roads and Trails

Forest roads provide both forest users and FS officials access to areas of interest in the Carson NF. For some areas forest roads allow the only access to complete maintenance and rehabilitative activities. Access to the forest becomes critical in the event of a forest fire or other catastrophic event. In the context of the Carson NF, forest roads are the primary way to get in and around the forest, as most of the forest does not have paved roads to permit access. For example, the Jicarilla RD is covered with forest roads because the only main thoroughfare is US64, which runs east-

west through the center of the district. This is the case in much of the forest, as US64, US84 and US285 are the closest major highways; they surround the perimeter of many forest areas.

Table 3.5 below shows the length and type of forest roads throughout the Carson NF. In all, the Carson NF features almost 11,000[48] miles of forest road. The Tres Piedras and Camino Real RDs each have over 1,000 miles of dirt forest road. Together, the two districts contain about 20 percent of all forest roads in the Carson NF. The table also shows that about half of the forest roads are "natural material," most likely indicating a dirt road. Besides natural materials, the most common road treatment is crushed aggregate, but with only 216 miles. FS roads are typically not plowed or maintained during winter months, thereby limiting access during inclement weather.

The FS maintains designated areas of forest wilderness as roadless areas. These areas are the subject of national debates among environmental groups, forest resource interests and state and federal governments. This particular use of land is discussed further in Chapter 6, **"Special Management Areas.**"

[48] All figures regarding FS roads and trails were calculated using the INFRA Roads data set provided by the Forest Service.

Table 3.5: Length of Forest Roads and Road Types in The Carson NF

Tres Piedras	Surface Type	Segment Length Miles
SINGLE LANE	Asphalt	8
	Crushed Aggregate	39
	Bituminous Surface	0
	Improved Native	9
	Native Material	1,076
	Paved	0
	Other	0
Single Lane Total		1,132
DOUBLE LANE	Asphalt	0
	Crushed Aggregate	0
	Bituminous Surface	0
	Improved Native	8
	Native Material	11
	Paved	0
	Other	0
Double Lane Total		19
TOTAL		**1,151**

Canjilon	Surface Type	Segment Length Miles
SINGLE LANE	Asphalt	0
	Crushed Aggregate	21
	Bituminous Surface	0
	Improved Native	0
	Native Material	657
	Paved	6
	Other	0
Single Lane Total		684
DOUBLE LANE	Asphalt	0
	Crushed Aggregate	0
	Bituminous Surface	0
	Improved Native	0
	Native Material	0
	Paved	0
	Other	0
Double Lane Total		0
TOTAL		**684**

El Rito	Surface Type	Segment Length Miles
SINGLE LANE	Asphalt	0
	Crushed Aggregate	29
	Bituminous Surface	0
	Improved Native	0
	Native Material	847
	Paved	0
	Other	0
Single Lane Total		876
DOUBLE LANE	Asphalt	0
	Crushed Aggregate	0
	Bituminous Surface	0
	Improved Native	0
	Native Material	1
	Paved	0
	Other	0
Double Lane Total		1
TOTAL		**877**

Questa	Surface Type	Segment Length Miles)
SINGLE LANE	Asphalt	0
	Crushed Aggregate	1
	Bituminous Surface	0
	Improved Native	0
	Native Material	563
	Paved	1
	Other	0
Single Lane Total		565
DOUBLE LANE	Asphalt	0
	Crushed Aggregate	49
	Bituminous Surface	0
	Improved Native	5
	Native Material	76
	Paved	0
	Other	0
Double Lane Total		130
TOTAL		**695**

Camino Real	Surface Type	Segment Length Miles)
SINGLE LANE	Asphalt	3
	Crushed Aggregate	65
	Bituminous Surface	0
	Improved Native	0
	Native Material	1,054
	Paved	1
	Other	0
Single Lane Total		1,123
DOUBLE LANE	Asphalt	0
	Crushed Aggregate	12
	Bituminous Surface	0
	Improved Native	0
	Native Material	0
	Paved	0
	Other	0
Double Lane Total		12
TOTAL		**1,135**

Jicarilla	Surface Type	Segment Length Miles
SINGLE LANE	Asphalt	0
	Crushed Aggregate	0
	Bituminous Surface	0
	Improved Native	40
	Native Material	438
	Paved	0
	Other	0
Single Lane Total		478
DOUBLE LANE	Asphalt	0
	Crushed Aggregate	0
	Bituminous Surface	0
	Improved Native	0
	Native Material	0
	Paved	0
	Other	0
Double Lane Total		0
TOTAL		**478**

Unidentified District	Surface Type	Segment Length Miles)
SINGLE LANE	Asphalt	0
	Crushed Aggregate	0
	Bituminous Surface	0
	Improved Native	0
	Native Material	396
	Paved	0
	Other	32
Single Lane Total		428
DOUBLE LANE	Asphalt	21
	Crushed Aggregate	0
	Bituminous Surface	164
	Improved Native	0
	Native Material	0
	Paved	0
	Other	25
Double Lane Total		210
TOTAL		**638**

Carson Total	Surface Type	Segment Length Miles)
SINGLE LANE	Asphalt	11
	Crushed Aggregate	155
	Bituminous Surface	0
	Improved Native	49
	Native Material	5,031
	Paved	8
	Other	32
Single Lane Total		5,286
DOUBLE LANE	Asphalt	21
	Crushed Aggregate	61
	Bituminous Surface	164
	Improved Native	13
	Native Material	88
	Paved	0
	Other	25
Double Lane Total		5,658
TOTAL		**10,944**

Source: USDA Forest Service Infra Roads Database. Calculations done by UNM-BBER.

Table 3.6 depicts the number of miles of trails by each RD. No data was available for the Tres Piedras, Jicarilla, and El Rito RDs implying that there may not be developed or officially designated trails in those areas.[49] The Carson NF has 460 miles of trails total; about half of them being in the Camino Real RD. Across the entire forest, there are only 15 miles of trail specifically designated for off-highway vehicle (OHV) use; see Table 3.4 on previous page. A complete list of all trails in the Carson NF is provided in the appendix (**Table A.2**).

[49] No data was available in the INFRA Roads database.

Table 3.6: Length of Forest Trails and Trail Types in The Carson NF[50]

Canjilon District

Trail Type	Managed Use	Segment Length (in miles)
Standard/Terra	Hike	0
	Pack/Saddle	66
	ATV	0
	Cross Country	0
	Bicycle	0
	Motorcycle	0
	Total	**66**
Snow Trail	Hike	0
	Pack/Saddle	0
	ATV	0
	Cross Country	0
	Bicycle	0
	Motorcycle	0
	Total	**0**

Questa

Trail Type	Managed Use	Segment Length (in miles)
Standard/Terra	Hike	5
	Pack/Saddle	132
	ATV	7
	Cross Country	0
	Bicycle	2
	Motorcycle	2
	Total	**148**
Snow Trail	Hike	2
	Pack/Saddle	0
	ATV	0
	Cross Country	0
	Bicycle	0
	Motorcycle	0
	Total	**2**

Camino Real

Trail Type	Managed Use	Segment Length (in miles)
Standard/Terra	Hike	8
	Pack/Saddle	160
	ATV	8
	Cross Country	0
	Bicycle	5
	Motorcycle	65
	Total	**246**
Snow Trail	Hike	0
	Pack/Saddle	0
	ATV	0
	Cross Country	5
	Bicycle	0
	Motorcycle	0
	Total	**5**

Carson Total

Trail Type	Managed Use	Segment Length (in miles)
Standard/Terra	Hike	13
	Pack/Saddle	358
	ATV	15
	Cross Country	0
	Bicycle	7
	Motorcycle	67
	Total	**460**
Snow Trail	Hike	2
	Pack/Saddle	0
	ATV	0
	Cross Country	5
	Bicycle	0
	Motorcycle	0
	Total	**7**

Source: USDA Forest Service Infra Trails Database. Calculations by UNM-BBER.

The Carson NF Attitudes, Values, and Beliefs study revealed that many forest users perceive the forest trails to be in increasing states of disrepair, which can negatively affect recreational experiences. Trails with extensive damage are often closed for maintenance, increasing trail use in other areas. As a result, increased environmental damage and user conflict might arise among different types of users. The study participants suggest that access to more trails is needed to disperse use over a larger area.[51]

[50] Does not include user-created trails.

[51] J. C. Russell, J. and Adams-Russell, A. (2005). Attitudes, Values and Beliefs Toward National Forest System Lands: The Carson National Forest. USDA Forest Service.

3.4.1 Travel Management Planning

FS roads and trails are the focus of the FS Travel Management Planning process, which aims to re-designate and re-classify Forest-managed roads and trails. Under a 2005 FS policy, each NF in the country must designate roads, trails and other areas to dirt bikes and other off-highway vehicles (OHVs).[52] Once a system of roads and trails is designated, OHV use in any other areas of the forest is prohibited. OHV-designated routes and areas will be established after citizens have had an opportunity to express their thoughts on access issues, including the type of motorized travel appropriate to each area. [53]

The Travel Management Rule planning should be complete by September 2009. The first phase of the process is to collect and document the wants and travels needs of the public and other users and to educate them about the process and time table for implementation. The Carson NF officials began this stage in July 2006.[54] The FS is asking the public to contribute information about traditional trails and user created trails and to address whether or not these routes should be included in the designated system. Groups such as the Blue Ribbon Recreationists are encouraging the FS to incorporate many user-defined roads and trails onto the forest's map, as they are popular routes for OHV-enthusiasts.

3.5 Right-of-Way and Other Access Issues

Generally speaking, right of way issues are not a major concern in the Carson NF. However, that is not to say that they do not exist or will not exist in the future. Currently, there exists legal access to the major recreational areas, Taos Ski Valley and Wheeler Peak, which has not always been the case.[55] Problems arise where there is no legal right-of-way through private property or when property ownership changes. In most cases, private landowners do allow access, but with changes in property ownership that could change. To protect their privacy and property, many landowners block access to the forest with locked gates and "No Trespassing" signs. Forest visitors are often unpleasantly surprised when they encounter a locked gate or sign denying them access to the public forest.

When there are right-of-way issues, the FS tries to resolve them by purchasing easements following a trail or road through the property. In cases when the FS is unable to secure an easement, another strategy is to build an alternative trail or road that goes around private property. However, this is much costlier than purchasing an easement. Whenever any changes to public lands are proposed, the FS must first conduct an Environmental Impact Study (EIS) to determine if there are any possible negative impacts on habitats, wildlife and watersheds. Further, studies must be conducted that explore the presence of cultural resources and ensure they are not compromised by any changes. When the FS purchases an easement on an existing road these evaluative studies are nowhere near as costly.

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[52] States News Service. "Travel Management Begins on National Forest," June 23, 2006.
[53] Staci Matlock. "Forest Service to Hold Meetings on ATV Trails." *The Santa Fe New Mexican*. August 6, 2006, C-6.
[54] USDA Forest Service press release. http://www.fs.fed.us/r3/carson/news/2006/6_22_06_tmr_public-meetine.shtml
[55] Personal Communication with Forest Official, April 24, 2006.

According to a forest official, private landowners may not want to deal with the "hassle" of exercising property rights and building fences to limit access, especially if the access route is popular.[56] In the past, some visitors have torn down fences that are blocking access, although this is not a common occurrence.

Currently, the biggest access issue facing the Carson NF is in the Canjilon RD near Echo Amphitheatre and Ghost Ranch. The FS service is trying to secure an easement around FS Road 151, which travels through the Ghost Ranch area. So far, the FS has been unsuccessful in these attempts.[57]

3.6 Challenges and Opportunities for Forest Management

Forest lands that lack easy access to larger markets typically have the greatest influence on economic growth in the local rural counties, because forest lands become one of the few substantial economic forces in the area. [58] As a result, Forest management decisions regarding access and travel will have substantial implications to the socioeconomic vitality of the area.

In the Carson NF, the FS has many opportunities to interact with local residents and increase access to the area, providing the chance to stimulate economic activity. The major recreational sites have established rights-of-way. Open rights-of-way, along with the list of transportation infrastructure improvements slated for the next few years, ensure visitors' access to the forest for years to come.

Given the distance from the state's major airport, visitors to the forest are most likely residents of the surrounding communities and other parts of New Mexico. Communities like Taos and Santa Fe are already established "destinations" that attract visitors from all around the state and beyond. The Carson NF may be able to benefit by attracting visitors already in the area.

Enhancing access to natural amenities will not only attract more visitors but will also invite new residents. Often, new residents are educated individuals who have made their living being self-employed or from investments. Some researchers suggest that inviting these affluent people can stimulate economic development in an area.[59]

Another opportunity is to increase access within the forest. The FS is currently participating in a travel management planning process and is soliciting input from the public regarding travel wants and needs. Since summer 2006, Forest officials have been organizing town hall-type events to formally hear and document public opinion about how best to accommodate OHV recreation and preserve forest health. Once the travel management plan has been finalized and areas of the forest have been designated as OHV-use areas, there may be less tension between OHV users and other

[56] Ibid.
[57] Ibid.
[58] Shumway J.M. and S.M. Otterstrom. 2001. "Spatial Patterns of Migration and Income Change in the Mountain West: The Dominance of Service-Based, Amentity-Rich Counties." *Professional Geographer.* Vol. 53(4): 492-502. and R. Rasker, B. Alexander, J. van den Noort, and R. Carter. (2004). "Prosperity in the 21st Century WEST." The Sonoron Institute.
[59] Nelson, P. (2000). Quality of Life, Nontraditional Income, and Economic Growth. Rural Development Perspectives. 14(2): 32-37, and Rudzitis, G. (2000). Amenities Increasingly Draw People to the Rural West. Rural Development Perspectives. 14(2): 9-13.

users, as their paths may be less likely to cross. However, this may backfire – if a designated area becomes too congested or over-run with motor vehicles, some users will seek less crowded areas that are not designated for OHVs and these areas may sustain considerable damage.

Increasing access to the forest for visitors and new residents certainly carries inherent risks. Inviting more visitors and tourists may irritate long-time resident families who consider the land part of their heritage more than a recreational destination. Also, inviting more people to live near the forest has implications for the Wildland-Urban interface as more residential structures are being purchased and built around the forest. Later chapters will show discord between residents, visitors and newcomers, all of whom use the forest differently.

4 Land Cover and Ownership

This chapter examines issues related to land cover and land ownership in the Carson NF. The first section examines the various types of land cover in each of the ranger districts. The second and third sections discuss specific forest issues relating to land cover: invasive species and forest fires. The fourth section discusses recent land exchanges and the policy environment around future conveyances. These specific topics are important because they have significant implications for the forest's health and ways in which the land is used.

The geographic data for this section is taken from the United States Geological Survey National Land Coverage Data set (NLCD), a raster based Landsat imagery. The data is obtained for each county with a 30 meter resolution making the data fairly accurate. The Arc Info Geographic Information Systems software is used to extract the necessary data for each contextual geographic area. The FS provided the land exchange and conveyance data and the invasive species and fire information was obtained from discussions with Forest officials and the examination of archival sources.

4.1 Land Cover on the Carson National Forest

Table 4.1 provides land cover classifications for each ranger district based on data compiled in the NLCD. About 60 percent of the Carson NF (928,139 acres) is covered by evergreen forest. The second most common land cover is grassland, making up about 23 percent (359,737 acres). The Tres Piedras RD is the largest RD (388,147 acres) and about half of the district is covered by grassland (185,515 acres). Tres Piedras accounts for about 50 percent of all grassland in the forest. However, most of the grazing on the Carson NF is in the El Rito RD, which has the highest number of active grazing permits. El Rito is about 26 percent covered by grassland and 21 percent covered by shrubland, with 72,897 and 58,426 acres, respectively. The Questa RD, which has the Taos Ski Valley and Red River Ski Area, has over 200,000 acres of evergreen forest. **Figure 4.1** is a map illustrating land cover types on the Carson NF.

Table 4.1: Land Cover on The Carson NF (Acres)[23]

	Tres Piedras	Canjilon	El Rito	Questa	Camino Real	Jicarilla	Total Carson
Bare Rock/Sand/Clay	47	105	112	593	902	33	1,793
Commercial/Industrial/Trans	43	14	33	173	54	2	320
Deciduous Forest	3,156	1,696	1,275	3,483	2,402	1,371	13,382
Emergent Herbaceous Wetlands	0						0
Evergreen Forest	119,586	85,126	145,108	204,509	300,606	73,204	928,139
Fallow	3		**7**	4	6		20
Grasslands Herbaceous	185,515	41,318	72,897	31,115	21,220	7,673	359,737
High Intensity Residential							0
Low Intensity Residential				95	6		101
Mixed Forest	2,230	2,163	1,044	1,406		13,485	20,329
Open Water	77	8	17	81	8	6	197
Pasture/Hay	183	1,176	1,066	75	703	7	3,209
Quarries/Strip Mines/Gravel Pits	4	2	57	2,076	10		2,149
Row Crops	222		**1**	8		11	243
Shrubland	77,080	19,038	58,426	33,265	8,331	62,051	258,192
Small Grains							0
Transitional	1	13					14
Urban/Recreational/Grasses			2	1	1		5
Woody Wetlands						9	9
Total	**388,147**	**150,658**	**280,047**	**276,885**	**334,248**	**157,852**	**1,587,836**

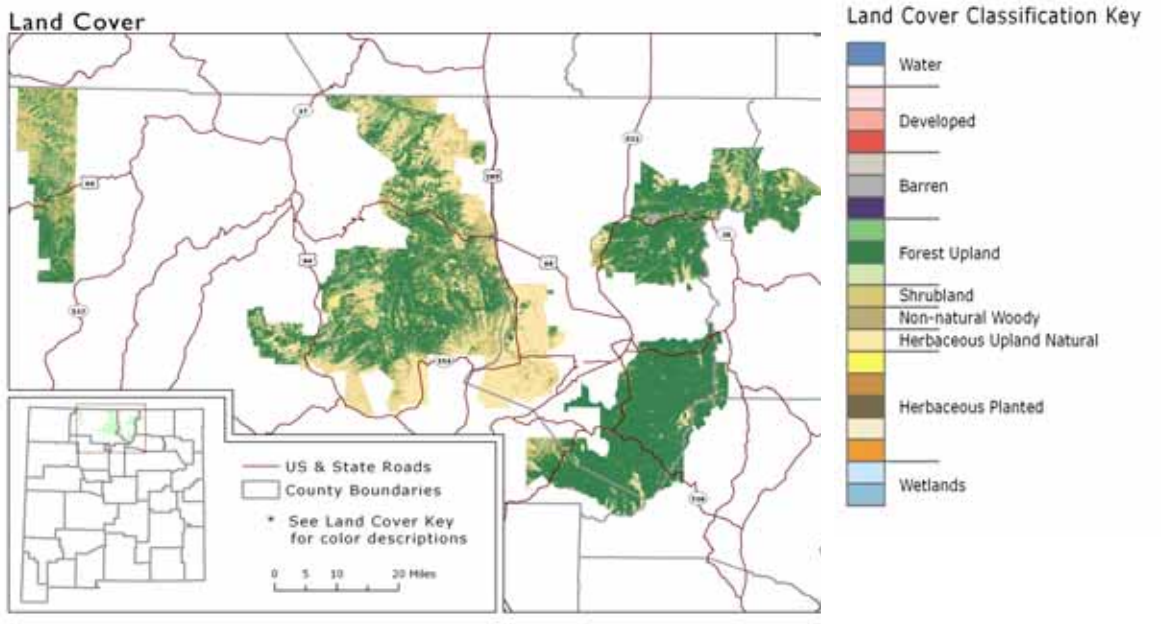

Figure 4.1: Land Cover on The Carson NF

[23] Values indicating '0' acres represent a value between zero and 0.5 acres.

4.2 Land Ownership

Overall, there are 105,010 acres of the Carson NF that are privately owned, making up seven percent of the entire forest. The two most common land covers, evergreen forest and grasslands, have differing proportions of land owned by private interests. Private landowners own only four percent of evergreen forest acres, whereas private interests own 12 percent of the grassland. Generally, economically viable land (such as grazing land) is more likely to be owned by private interests. It is also interesting to note that about a third of all privately owned evergreen forests (11,417 acres) are in the Questa RD, presumably the Taos Valley Ski Area. Similar patterns were revealed in the Cibola NF as well. **Table 4.2** shows, in great detail, the breakout of publicly and privately owned land in the Carson NF. **Figure 4.2** also shows the differences in land ownership in map form.

Table 4.2: Land Cover of Publicly and Privately Owned Land in The Carson NF [24]

	Tres Piedras			Canjilon			El Rito			Questa		
	NFS	Private	Total	NFS	Private	Total	NFS	Private	Total	NFS	Private	Total
Bare Rock/Sand/Clay	47	0	47	97	8	105	110	1	112	593	0	593
Commercial/Industrial/Trans	15	28	43			0	18	14	33	48	125	173
Deciduous Forest	2,670	486	3,156	1,497	200	1,697	968	307	1,275	3,312	171	3,483
Emergent Herbaceous Wetlands		0	0			0			0			0
Evergreen Forest	115,014	4,486	119,501	81,051	4,084	85,135	140,724	4,384	145,108	193,064	11,417	204,481
Fallow	2	2	3			0	6	1	7	2	1	4
Grasslands Herbaceous	163,801	21,819	185,620	34,921	6,398	41,320	65,922	6,985	72,907	28,213	2,910	31,123
High Intensity Residential			0			0			0			0
Low Intensity Residential			0			0			0	8	87	95
Mixed Forest	2,187	43	2,230	2,079	87	2,167	1,036	8	1,044	1,406	0	1,406
Open Water	74	3	77	8	0	8	17		17	77	4	81
Pasture/Hay	67	115	183	11	1,165	1,176	16	1,050	1,066	10	65	75
Quarries/Strip Mines/Gravel Pits	4		4	1	1	2	34	23	57	357	1,720	2,076
Row Crops	222		222		6	6	1		1			0
Shrubland	71,329	5,773	77,102	17,338	1,696	19,034	55,472	2,954	58,426	31,172	2,095	33,266
Small Grains			0			0			0			0
Transitional	1		1		13	13			0			0
Urban/Recreational/Grasses			0			0	0	2	2		1	1
Woody Wetlands			0			0			0			0
Total	355,432	32,756	388,187	137,003	13,658	150,661	264,326	15,731	280,056	258,262	18,596	276,858

	Camino Real			Jicarilla			Carson Total		
	NFS	Private	Total	NFS	Private	Total	NFS	Private	Total
Bare Rock/Sand/Clay	902		902	33		33	1,782	3	1,785
Commercial/Industrial/Trans	37	17	54	2	0	2	131	197	328
Deciduous Forest	1,885	517	2,402	1,346	25	1,371	11,677	1,702	13,382
Emergent Herbaceous Wetlands			0			0		0	0
Evergreen Forest	286,431	14,175	300,606	72,344	860	73,204	888,727	39,488	928,189
Fallow	2	4	6			0	12	8	20
Grasslands Herbaceous	17,447	3,772	21,220	7,207	465	7,673	317,474	42,246	359,710
High Intensity Residential			0			0			
Low Intensity Residential	0	6	6			0	8	88	97
Mixed Forest			0	13,357	128	13,485	20,066	267	20,330
Open Water	8		8		6	6	183	15	197
Pasture/Hay	24	678	703		0	0	133	3,079	3,208
Quarries/Strip Mines/Gravel Pits	9	2	10	7		7	403	1,759	2,161
Row Crops		2	2	11		11	242	7	250
Shrubland	7,669	662	8,331	59,110	2,941	62,051	242,097	16,139	258,224
Small Grains			0			0			
Transitional			0			0	1		1
Urban/Recreational/Grasses		1	1			0	0	5	5
Woody Wetlands			0	2	7	9	2	7	9
Total	314,414	19,836	334,250	153,420	4,432	157,852	1,482,937	105,010	1,587,947

Note: Small errors in calculations are the result of 'edge rounding' associated with the use RASTER based NLCD.
Source: USGS EROS, National Land Cover Data (NLCD), Date 1992 (New Mexico). Calculations by UNM-BBER.

[24] Values indicating '0' acres represent a value between zero and 0.5 acres.

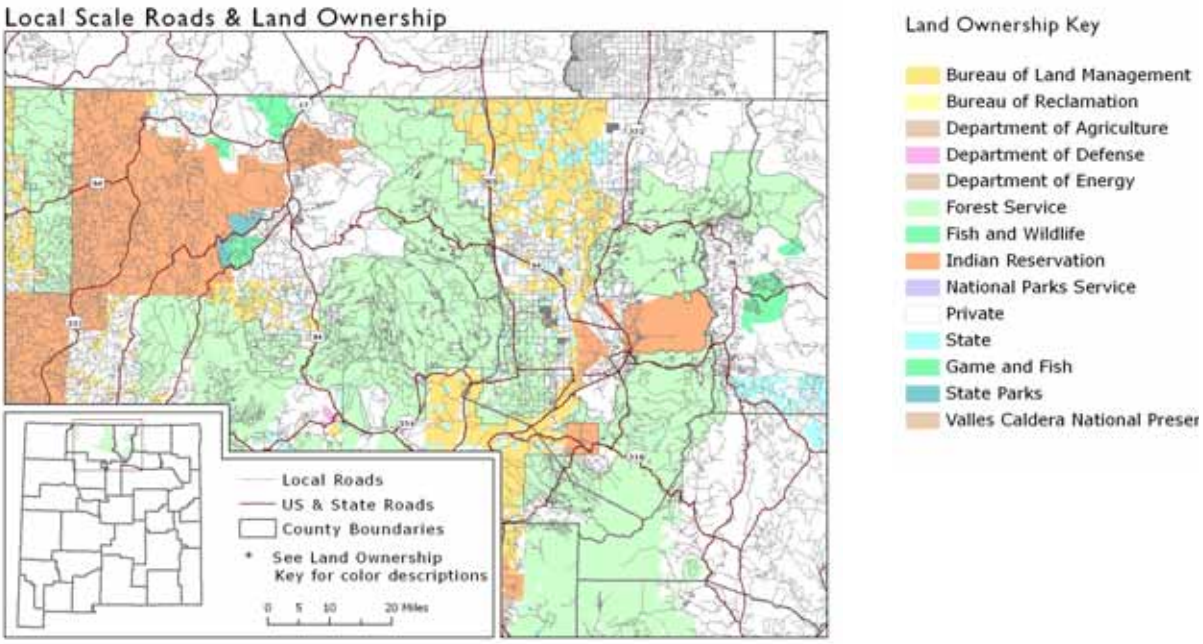

Figure 4.2: Land Ownership on the Carson NF

4.3 Land Conveyance and Exchanges

The FS provided BBER with data concerning land conveyances and exchanges in the Carson NF. Generally speaking, parcels of forest land scattered around the boundaries of the forest are often costly and difficult to manage, and pose significant right-of-way issues. However, FS officials have often expanded contiguous forest areas by trading isolated parcels for more valuable land on the edge of or inside forest's boundaries.

According to data provided by the FS, the last two land conveyances were in fiscal years 1988 and 1989. In FY1988, the FS exchanged about 20 acres of land (worth $91,200) for about 24 acres plus $18,500 cash with Angostura Homes. In FY1989, the FS obtained about 35 acres (valued at over $62,000) to be held in public trust under the Sisk Act of 1960. This act provided that any land that a NF receives from a past exchange becomes part of the national park or forest within which it was located. (See Charlton and Healy vs. United States for a full discussion of the Sisk Act).[25]

Land administrators in Region 3 have viewed transfers of land from National Forests, even for public purpose, as disappointments.[26] They view the transfer of public lands, which are available for general public use and enjoyment, to exclusive use of a certain segment of the population (without suitable recompense to the public) as contrary to the public interest. This was the underlying issue in the transfer of two areas from the Carson NF to Taos Pueblo; the Blue Lake

[25] Strickland et al v. United States, United States Court of Appeals for the Federal Circuit, http://caselaw.lp.findlaw.com/cgi-bin/getcase.pl?court=Fed&navby=case&no=995019.
[26] Timeless Heritage: A History of the Forest Service in the Southwest. (1988) USDA Forest Service.

area during the Kennedy administration and the Rio Pueblo Drainage during the Nixon administration. [27]

4.4 Invasive Species

Invasive species have been characterized as a "catastrophic wildfire in slow motion." Invasive plants and insects can cause major disruptions in ecosystem function. Invasive species can reduce biodiversity and degrade ecosystem health in forest areas. The damage caused by invasive organisms negatively affects the health of the forest and its resident wildlife, livestock, fish, and people.[28] Native species, such as the bark beetle, can cause significant damage when the forest's health is already compromised by other conditions.

In regards to noxious weeds, wildlife habitat can be compromised as they take over native plant communities. Palatable forage for game and non-game species of wildlife decreases as weeds like thistle, leafy spruce and yellow toadflax take over. Weeds such as black henbane, poison hemlock and yellow starthistle can poison animals. [29]

Invasive or noxious weeds are common in roads, trails, and riparian areas and can be spread by OHVs, grazing animals, visitors, and water flow. Many weed species can increase erosion. For example, Russian knapweed has a single, deep taproot and drives out native grasses that have better soil-holding root systems.[30] These weeds are a problem especially on US285 between Tres Piedras and Ojo Caliente.[31] Most invasive weeds are thistles (biennials and perennials), saltcedar, and Siberian elm. An example in the Carson NF area is the Canada Thistle (*Asteraceae*), which is common in the higher elevations of northern and central New Mexico. According to FS staff, Canada Thistle is present along roadways and is beginning to show in riparian areas.

One invasive weed species is posing an especially complex problem in the Valle Vidal Unit. The bullthistle, an annual biennial, has been found intermixed with native thistle. The two have begun hybridizing, making detection and elimination of the bullthistle virtually impossible. The best time to kill bullthistle is in its rosette stage. However, in its rosette stage, bullthistle looks exactly like the native thistle. The FS cannot simply eliminate all thistles because the native thistle is an integral player in the ecosystem, feeding butterflies and other species of pollinators. This frustrating situation hampers FS efforts to eliminate invasive weeds before they become an epidemic.

Drought conditions can both help and hamper the spread of noxious weeds. While water shortages can suppress the spread of some weeds, drought resistant weeds will have an advantage over native species which are suppressed by drought conditions.[32] Perennial pepperweed poses

[27] Timeless Heritage: A History of the Forest Service in the Southwest. (1988) USDA Forest Service
[28] US Forest Service, "Invasive Species Program," US Forest Service, http://www.fs.fed.us/invasivespecies/definition.shtml.
[29] USDA Forest Service, Final Environmental Impact Statement – Invasive Plan Control Project.
[30] Ibid.
[31] Personal Communication with Forest Official. April 25, 2006.
[32] Ibid.

another troublesome dilemma because the only effective non-herbicidal method of treating it is continuous flooding. Of course given the current drought conditions, the FS has limited options.[33]

Some forest areas in New Mexico came under heated criticism for the use of herbicides to kill noxious weeds. In January 2006, the Carson NF proposed to use herbicides, among other methods, to kill weeds in a 7,000 acre area.[34] However, environmental groups such as Carson Forest Watch[35] and resource advocates like the Gallinas Watershed Council[36] fear that herbicides can contaminate important watersheds like the Gallinas Watershed. This watershed is the principal source of water for Las Vegas, NM. Further, critics argue that herbicides pose risks to fragile aquatic life and sensitive wildlife pollinators, such as butterflies. [37] Special use permits for sheep and goats is perceived as one non-chemical approach for dealing with noxious weeds.[38] The Carson NF staff is currently re-evaluating its species control plan.[39]

The Carson NF is home to many chemical sensitive interests; like organic beef ranchers for instance.[40] Companies using the land to produce certified organic products have a vested interest in keeping herbicides out of the forests. The FS is working with these groups on plans that would treat invasive weeds before they reach the point where herbicides are the only real option. The FS is encouraging owners of adjacent properties to keep their "home place" clear, which would help make FS efforts more effective.[41]

In addition to noxious weeds, invasive species include insects that are problematic under certain conditions. For example, drought conditions are conducive to bark beetle epidemics. Species include the fir engraver (*Scolytus ventralis*), the piñon ips and the five-spined ips. Bark beetle populations "crashed" in 2004, but the forest is at risk for a new infestation due to the recent drought conditions. [42] Bark beetles are native to the southwest United States and play a positive function in the forests' ecosystems. Trees can usually live with bark beetle damage.[43] Beetles only reach infestation levels when the health of the trees has already been compromised by other factors, such as drought or overcrowding. Bark beetles feed on piñon trees (among others) causing them to dry out and die, resulting in higher fuel levels and increased fire danger.

The beetles attack trees by chewing through the outer bark and laying eggs. When the eggs hatch, the larvae feed on the soft, nutrient-rich inner bark. Further, the beetles introduce a blue stain fungus that spreads through and clogs the water and nutrient transfer materials, causing tree death. Once the insects mature, they leave the infested tree and travel to a new host.

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[33] Ibid.
[34] Associated Press, "Forester Rejects Herbicides in Santa Fe, Carson Forests," February 25, 2006.
[35] Associated Press "Environmentalists Want Alternatives for Killing Weeds," January 12, 2006.
[36] Dave Kavanaugh, " Watershed Herbicide Plan Draws Criticism; Invasive Weed Removal Debated." *Albuquerque Journal,* January 12, 2006. p.2.
[37] Joanie Berde, *The Santa Fe New Mexican*, January 14, 2006.
[38] J. C. Russell and P. A. Adams-Russell, Values, Attitudes and Beliefs Toward National Forest System Lands: The Carson National Forest (Placerville, CA: USDA Forest Service, 2005).
[39] Associated Press, "Forester Rejects Herbicides in Santa Fe, Carson Forests." February 25, 2006.
[40] Associated Press "Environmentalists Want Alternatives for Killing Weeds," January 12, 2006.
[41] Personal Communication with Forest Official. April 25, 2006.
[42] Tom Sharpe, "Preparing for the Worst," *The Santa Fe New Mexican*, February 21, 2006.
[43] USDA Forest Service, Southwestern Region, "Engraver Beetles in Southwestern Pines" Brochure, May 2003.

There is nothing that can be done to save a tree after it has been successfully attacked by the beetles and infected with a blue stain fungus. To make matters worse, tree mortality can occur very rapidly because beetles produce several generations each year. Due to the extent of the recent outbreaks, and the way in which they attack trees, there is little that can be done to kill them. According to FS officials, the beetle infestation will continue until drought conditions subside and trees recover their vigor. In order to reduce the impacts of future outbreaks, forest health must be improved by thinning overcrowded stands of trees. On average, the pine forests are 37 times denser than they were 100 years ago.[44]

Another insect species, the western spruce budworm (*Chloristoneura occidentalis*) is the most widely distributed and destructive defoliator of coniferous forests in Western North America.[45] There is no predictable pattern or trend as to where these pests attack. Most of the early epidemics (1909-1966) lasted for just a few years and then subsided on their own. Sometimes, the epidemic would last longer without spreading to larger areas. For example, an epidemic in the northern Rocky Mountains, which began in 1949, persisted for over 40 years, in spite of repeated insecticide treatments between 1952 and 1966.[46]

The most common host trees of the western spruce-budworm are: Douglas fir, White fir, Engelmann spruce and Blue spruce. In New Mexico, western spruce budworm defoliation continues to be chronic on the Carson (114,990 acres in 2004) and Santa Fe (68,720 acres in 2004) National Forests.[47]

When necessary, western spruce-budworm populations can be treated with chemicals. However, the populations are more likely to be regulated by changing conditions in the forest. For instance, a decrease in drought conditions can give trees the ability to fight off an attack. However, during prolonged outbreaks when large stands become heavily defoliated, the budworms may starve and die off. When in epidemic proportions, natural predators of the budworm, like arthropods, mammals and birds, have little to no effect on the budworms' mortality.[48]

4.5 Fire and Fuels

Much of the West has been under drought conditions over the last several years. Continued drought conditions combined with high fuel loadings have created dangerous conditions for many forest areas in the West. Fire threatens all major contributions of the forest, including recreation, watershed protection, timber, wildlife habitat and scenic beauty.[49]

In early March 2006, a grassland fire burned over 12,000 acres near Miami, NM, marking the beginning of a very ominous fire season for the Carson NF. Within six hours, the fire grew to

[44] USDA Forest Service. Strategic Communication Pine Bark Beetle.
[45] David Fellin and Jerald Dewey, "Forest Insect and Disease Leaflet 53," USDA Forest Service, http://www.treesearch.fs.fed.us/pubs/10990.
[46] Ibid.
[47] USDA Forest Service, Southwestern Region Forestry and Forest Health, *Forest Insect and Disease Conditions in the Southwestern Region*, 2004.
[48] David Fellin and Jerald Dewey, "Forest Insect and Disease Leaflet 53," USDA Forest Service, http://www.treesearch.fs.fed.us/pubs/10990.
[49] Stewart, S., Radeloff, V., and Hammer, R. 2003. Characteristics and Location of the Wildland Urban Interface in the United States. USDA Forest Service, Evanston: IL.

more than 10,000 acres. Forest officials said the fire was one of the earliest large wildfires anyone can remember in the area.[50] A smaller wildfire burned about ten acres near Bitter Creek in April 2006.[51] At the time, FS officials compared moisture and fuel loading conditions to those immediately prior to the Hondo Fire[52] and the Cerro Grande fire[53]; both had catastrophic effects scorching thousands of acres of land and homes.

The FS is facing increased urgency to reduce the hazardous fuel loads and reduce the likelihood of a crown fire near the adjacent communities. However, some residents are concerned with the methods used in reducing fuel loads in the forest (specifically with chemical means).[54] Common treatments to reduce fuels include thinning, prescribed burning, and clearing the forest of debris. In some cases, the FS will use herbicides to kill invasive weeds that become fire fuel.[55] In January 2006, the Carson NF conducted its first spring prescribed burn in the Shady Brook Area, near US64 and Taos Canyon.[56] The prescribed burns provide safer conditions for fire firefighters and allow them more access to protect homes near the forest.

To complicate matters, the Carson NF is facing a decreasing number of available firefighters.[57] An Albuquerque Journal article described how the Carson NF is temporarily suspending a program that trains and deploys on-call wildland firefighters. While the program is popular and training classes are always well-attended, the firefighters are mostly unavailable when they are called upon to help in a fire.

In an interesting development, the Carson NF offered only limited permits for firewood harvesting. Weather, resource and wildlife protection were considered in making the decision to limit the number of permits available. By decreasing the traffic in the forest during winter months, the FS is able to protect soils vulnerable to erosion.[58]

While one of the main responsibilities of the FS is fire prevention for the sake of minimizing damage to ecosystems and wildlife habitats, increasing levels of residential development add more implications to land management. Forest fires threaten the residential structures in areas in and around the forest, comprising the Wildland-Urban Interface (WUI). In the Rocky Mountains and the Southwest, almost all major urban areas have a significant amount of WUI, indicating recent "sprawling" patterns of residential growth.[59] People living in the WUI expect to have some influence on the management of nearby areas and will often pressure land managers on what to do and how to do it. As described in Chapter 2, there are more and more second homes

[50] Staci Matlock, "Fire Season Off to a Hot Start," *The Santa Fe New Mexican*, March 2, 2006.
[51] Associated Press, "Firefighters Respond to Blaze near Red River," April 24, 2006.
[52] Ibid.
[53] Matt Mygatt, "Dry Winter, Landscape Prompt New Mexicans to brace for a Grim Fire Season," Associated Press. March 8, 2006.
[54] Associated Press, "Environmentalists Want Alternatives for Killing Weeds," January 12, 2006.
[55] Ibid.
[56] Associated Press, "Carson National Forest to Conduct Shady Brook Prescribed Burn," January 23, 2006.
[57] John Arnold, "Carson Releases Fire Team; Dry Weather is Raising Concerns," February 6, 2006.
[58] U.S. Federal, "New Firewood Permits Unavailable this Winter on Carson National Forest." January 25, 2006.
[59] Stewart, S., Radeloff, V., Hammer, R. Characteristics and Location of the Wildland-Urban Interface in the United States. USDA Forest Service.

being purchased and built in the WUI. As a result, the FS is tasked with mitigating pressures of resource damage due to wildfire and intense social pressure to mediate risks and losses.[60]

4.6 Challenges and Opportunities for Forest Management

About 7 percent of the land on the Carson NF is privately owned. Further, FS-owned land in the Carson NF borders land owned and managed by a diverse set of private landowners, each with unique priorities and objectives. A principal challenge in managing forest resources against threats of fire, invasive species and other risks is the coordination of the land use management practices – the best efforts of the FS cannot be completely successful without compatible measures by other landowners.

For example, federal and private land managers must work together to eradicate invasive plant species. Otherwise, the efforts will prove ineffective. In the case of local businesses that are ranching organic beef and organically growing herbs, the businesses and FS must partner-up in order to create an effective treatment and prevention plan. Local residents should take more care to keep invasive plant species under control in private property, especially if they wish to keep herbicides out of the forests.

Much of the grazing land on the forest is owned and managed by private interests. Any decisions made by private land managers have implications for the FS-managed land. For example, overgrazing in some areas makes them vulnerable to invasive weeds, which can spread to other parts of the forest. This demonstrates an opportunity (and necessity) for the FS to work with local land managers on collaborative interventions for noxious weeds and preventative activities for fire.

The associated risk is that the FS is perceived as the ultimate land managers and forest health is solely the responsibility of the agency. Given the magnitude of the Carson NF's ecological issues, namely invasive species and forest fires, and the FS's limited options in resolving the situation may easily erode the public's confidence in the FS's ability to manage forest resources. For example, many expect that the FS will and should remove dead trees from around communities and adjacent to private lands[61]. Where dead trees become a threat to people and or property, removing the problematic trees becomes a major cost issue for both the agency and the public. Balancing the different needs of people and natural resources is the familiar challenge associated with managing the forest's health.

[60] Ibid.

[61] McKinley, J. and Johnson, K. "On the fringe of forests: where homes and fire meet', *New York Times*, June 26, 2007. This article presents a useful discussion of public-private risks and responsibilities associated with residential development along the borders of public lands.

5 Forest Uses and Users

An examination of how the Carson NF is used and whom it is used by is offered in this chapter. The first few sections feature a description of historical and current land uses. Following is a discussion of the different types of land users. In general, the FS allows the land to be accessed for a multitude of uses including: recreation, tourism, subsistence, and grazing. Further, the forest provides non-tangible benefits to the community and visitors, such as scenic resources, religious sites and other quality of life features. Many individuals and groups own, manage, and use forest resources, each interacting with the forest environment in a different way. As such, forest users have significant consequences for forest ecosystems and the people who depend on them.[62]

In 1960, Congress passed the Multiple Use Sustained Yield Act authorizing and directing the Secretary of Agriculture to develop and administer the renewable resources of the National Forests, including outdoor recreation, watershed, timber and wildlife resources in a way that would make them available indefinitely. Ideally, it meant that no one demand should take precedence over another. The forests were no longer exclusively for growing and harvesting timber, nor for the use of recreationists or as a habitat for wildlife, nor for cattle grazing. [63] Since the Act was enacted, the FS has adhered to the multiple-use mandate, promoting access and use to all. However, multiple-use introduces complications; inherent conflicts arise when guaranteeing access to all users. As more and more people (visitors and residents) access the forest, inevitably the result is increased likelihood of one type of use to impinge on another, resulting in conflict. Land-use conflict is a major challenge for FS officials because it pervades into practically every planning decision.

The following sections describe historical and contemporary land uses on the Carson NF and how they are related to its socio-economic impact.

5.1 Recreation

Recreation is the primary use of the Carson NF and is the main attraction for visitors to the area. Recreation on the Carson NF is concentrated to a few areas. For instance, the ski areas on the Questa RD are the primary destinations on the forest attracting the most visitors. The Questa and Camino Real RDs each have over 30 designated recreational sites, while the El Rito and Jicarilla RDs have few. **Table A.4** in the appendix lists all designated recreational sites on the forest, including trailheads, interpretive sites, campgrounds and ski areas.[64]

The FS estimates how many visitors access the forest with the National Visitor Use Monitoring (NVUM) survey. Data collected by the FS indicates that at least 1 million people visited the Carson NF in 1999-2000. More than half of the visitors are local residents taking day trips to the forest for recreational purposes.[65] Using data from the NVUM study, **Table 5.1** provides an estimate of how many people visit the forest for recreation and wildlife related purposes. Recreational visitors access the forest for purposes such as hiking, camping (overnight and day-only) and picnics. It is important to note that many areas of the forest are not “fee areas,” meaning

[62] J. F. Dwyer, “Integrating social sciences in ecosystem management: People-forest interactions in the urban forest,” in H.K. Cordell (Ed.), *Integrating social sciences and ecosystem management: A national challenge*, (Athens, GA: USDA, Forest Service, Southern Research Station, 1995).
[63] Full text of the Act is available at http://www.fs.fed.us/emc/nfma/includes/musya60.pdf .
[64] INFRA Recreational Sites Database, USDA Forest Service.
[65] National Visitor Use Monitoring Survey data provided by the USDA Forest Service.

visitors can access the site without charge. The wildlife data includes hunters, anglers, and wildlife "watchers" (photographers, birdwatchers, etc). The data is limited in that BBER is unable to determine the number of visitors to each ranger district or to identify where visitors are coming from. The least number of visitors are locals making overnight trips without staying on forest land.

Table 5.1: Number of Recreational & Wildlife Forest Visitors of The Carson NF

Type of Visit	Recreation	Wildlife
Non-local Day Travel to Forest	60,642	5,998
Non-local Overnight Stay on Forest Land	90,963	8,996
Non- local Overnight Without Stay on Forest Land	515,458	50,979
Local Day Travel to Forest	222,355	21,991
Local Overnight With Stay on Forest Land	30,321	2,999
Local Overnight Without Stay on Forest Land	10,107	1,000
Total Carson Forest Users	**929,846**	**91,963**

Source: NVUM Carson 2000. UNM-BBER

Undoubtedly, the most visitors come to ski, snowboard and snowshoe. In the Questa RD, there are two popular ski areas that attract the most visitors. Visitor spending is by far the most substantial catalyst for economic activity on the Carson NF. This will be discussed in full detail in Chapter 7, "**Economic Impacts."**

There is no clear indication that there will be a decrease in visitors, especially as the surrounding communities grow and transportation infrastructures improve. The NVUM data show that most visitors are local, so growing communities may translate to a growing visitor base. As will be described in a later section of this chapter, long-term residents of areas surrounding the forest (namely ranchers and Native American groups) perceive visitors and recreationists to have less commitment and investment in maintaining the integrity of the land, and treat it as such. As recreation and tourism interests become key stakeholders in the forest, the risk for major conflict may increase.

5.1.1 Hunting and Wildlife

As part of the forest's recreational offerings, the wildlife in the Carson NF attracts visitors, ranging from hunters to wildlife watchers. In 2001, 595,000 New Mexico residents participated in hunting, fishing, or wildlife watching in forest areas throughout the state, contributing about $1 billion to the state's economy.[66] NVUM data show that over 90,000 people visited the Carson NF to see or hunt wildlife in 2003. Refer back to **Table 5.1.**

Under federal mandate, hunting is regulated by the states, which are responsible for issuing permits and licenses. In New Mexico, permits for elk, deer and antelope are issued on a lottery basis to New Mexico residents and non-residents. The seasons and hunting dates are highly

[66] U.S. Department of the Interior, Fish and Wildlife Service, 50 State Reports, 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation, http://fa.r9.fws.

regulated on the Carson NF. A full description of elk and deer hunting regulations, using FS sources, can be found in the appendix, **Table A.5.**

During the autumn months, sportsmen and women make their way to the Carson NF, including the Valle Vidal Unit, for guided and unguided hunts. A later section in this chapter will show that hunting guides and outfitters purchase about 40 percent of all recreation-related special use permits on the forest. In New Mexico, small geographical areas in the NF are designated as hunting management "units." The units are used to identify hunting areas, as regulations regarding hunting dates and limits are set at the unit-level. The information below was gleaned from the FS website[67] and other sources, such as hunting related publications.

Hunting takes place in areas ranging from the sub-alpine peaks of the Sangre de Cristo Mountains to the high plains near San Antonio Mountain, depending on one's game preferences. Common game species in the Carson NF include Merriam's Turkey, Pronghorn Antelope, Mule Deer, Bighorn Sheep and Bull Elk. The Merriam's Turkey is native to the Carson NF. Through several successful reintroductions and established native populations, there is a sufficient population of Merriam's Turkey to support spring hunting on the Carson NF. Currently, spring turkey hunting seasons are available on an unlimited over the counter license for Unit 49 on the Camino Real RD, Unit 51 on the El Rito, Canjilon, and Tres Piedras RDs and Unit 53 on the Questa RD.

One of the most sought after big game species in North America is the Rocky Mountain Bighorn Sheep. Typically, hunts for this species occur at the highest elevations of the Sangre de Cristo Mountains within the two wilderness areas. Through past restoration efforts, there is now a population of Rocky Mountain Bighorn Sheep healthy enough to support very limited hunting.[68] Currently, Bighorn hunting seasons are available on Units 44/45 within the Pecos Wilderness Area on the Camino Real RD and Unit 53 within the Wheeler Peak Wilderness Area on the Questa RD.

Elk is the premier big game in the state and are probably the most popular big game hunted on the Carson NF. Management of elk on the Carson NF goes back to the early 1900's when Rocky Mountain Elk were first introduced into northern New Mexico. Today, the Carson NF boasts one of the largest elk herds in the state. Elk hunting opportunities are abundant on all game management units (2, 5B, 44/45, 49, 50, 51, 52, 53, and 55) and districts on the Carson NF. However, it is said that the best elk hunting is on the Valle Vidal Unit (Unit 55A) on the Questa RD.

Mule Deer are one of the most difficult and sought after big game animals in North America. Like most of the western states, Mule Deer began to decline in the late 1980's to early 1990's. As a result, management agencies began to manage deer herds in many different ways. On the Carson NF, current management practices, such as a limited deer-entry system has allowed mule deer herds to slightly rebound and stabilize. Mule Deer hunting on the Carson NF is available in all game management units. Limited quota deer-entry permits are available on a limited draw basis for game management units: 2B, 5B, 44/45, 49, 50, 51, 52, and 53. Archery, muzzleloader, or rifle hunts for deer are available on all the ranger districts and units on the Carson NF.

[67] USDA Forest Service. Hunting on Carson NF, http://www.fs.fed.us/r3/carson/html_main/list_hunting.htm.
[68] Ibid.

For fishing, the Carson NF offers 400 miles of cold mountain streams and numerous lakes, many stocked with trout by the NM Department of Game and Fish. Popular fishing streams include La Junta, Santa Barbara, El Rito, Rio Pueblo, Rio Hondo, Rio, Costilla, Red River, Rio San Antonio, and obviously, the off-forest Rio Grande. In terms of suitable lakes, there is Hopewell, Cabresto, Trout Lakes, Canjilon, Lagunitas and Shuree Ponds.

5.2 Grazing

Ranching activities are a defining characteristic to the heritage and social history of the communities immediately surrounding the forest. Grazing is one of the Carson NF's primary uses and is certainly embedded in the culture and history of the local residents. Even though it's not a major economic force, ranchers engage in this traditional activity because it is part of their lifestyle in rural New Mexico. Livestock animals are important components of household economies; most small ranchers no longer depend on their crops and animals for full economic support. The animals are typically used as a partial subsistence and as a means for special expenses or emergencies.[69] Ranchers in northern New Mexico have a different profit orientation than ranchers in other parts of the state. They do not do it to improve economic conditions, but do it in spite of them. [70] Local ranchers have maintained their way of life over generations even when it would make more economic sense to sell their land to developers and subdividers.[71]

According to forest researchers Raish and McSweeney, the majority of ranches in New Mexico are small, cow-calf operations with from one to ninety-nine head. Ranches of this size constituted 70 percent of the state's 8,313 ranches in 1996. That same year, in the north-central region of this state, small operations (less than 99 head) made up 82 percent of the 1,804 ranches. Large ranches in the north central region make up three percent of the total ranches, whereas statewide, large ranches account for seven percent of the total.[72]

In the context of the Carson NF, **Table 5.2**[73] shows the number of individual and association permits and allotments that are currently active. Currently, there are 183 active grazing permits on about 70 allotments. The El Rito RD has the most active permits, followed by the Canjilon RD.

[69] Raish, C, and McSweeney, A. (2003). "Economic, Social, and Cultural Aspects of Livestock Ranching on the Espanola and Canjilon Ranger Districts of the Santa Fe and Carson National Forests: A Pilot Study," USDA Forest Service, September 2003.

[70] Raish, C, and McSweeney, A. (2001). "Livestock Ranching and Traditional Culture in Northern New Mexico." *Natural Resources Journal*, vol. 41: 713.

[71] Thomas, J.W., and Gripke, S.L. (2002). "Maintaining Viable Farms and Ranches Adjacent to National Forests for Future of Wildlife and Open Space." *Rangelands*, 24(1).

[72] Raish, C. and McSweeney, A. "Livestock Ranching and Traditional Culture in Northern New Mexico," *Natural Resources Journal*, vol. 41 (2001): 713.

[73] Data was provided by the USDA Forest Service and is considered the best source of information pertaining to grazing permits.

Table 5.2: Number of Grazing Permits Sold on The Carson NF

	# Permits	# Allotments		
		Active	Closed	Vacant
Tres Piedras	21	17	0	0
Canjilon	41	12	0	0
El Rito	65	10	0	0
Questa	21	13	1	2
Camino Real	28	12	0	3
Jicarilla	7	6	0	0
District Total	**183**	**70**	**1**	**5**

Source: USDA Forest Service Grazing Permits and Grazing Allotment Databases

The cost of permits to graze on public land is subject to change and consistently faces considerable public scrutiny. Some believe that ranchers are paying less than fair market value for grazing fees. Comparisons are frequently drawn between the fees for grazing on private land versus the fees for grazing on federal land. According to a study of ranchers in the Santa Fe and Carson National Forests, the permittee rancher is sometimes criticized as being "subsidized" by the federal government. Others argue, to the contrary, that the additional costs associated with a grazing permit, such as upkeep and maintenance of improvements, make up for the difference in fees. Further, costs associated with public access (theft, vandalism and disruption of ranching operations) also increase operational costs for public land ranchers. As populations and recreation visits to public lands increase, such costs are expected to rise.[74]

Grazing fees are charged per animal-unit-month (AUM). The AUM is the amount of forage needed to sustain one cow and her calf, one horse or five sheep or goats for a month. The grazing fee for Western public lands was raised to $1.43 per AUM from $1.35 in 2003.[75] The 2005 fee is $1.79 per AUM.[76] [77] The INFRA database had substantial amounts of missing grazing fees data, so BBER was unable to calculate the total permit value. **Table 5.3** shows the AUMS present in the Carson NF from 1985 to 2002. The INFRA database also contains data indicating the acreage of grazing allotments. However, BBER staff was informed that the data represented "ballpark estimates" of acreage and the figures may include additional acreage such as BLM, private land and in-holdings. BBER was unable to determine how many acres of grazing were in each RD.

[74] Raish, C. and McSweeney, A. "Economic, Social, and Cultural Aspects of Livestock Ranching on the Espanola and Canjilon Ranger Districts of the Santa Fe and Carson National Forests: A Pilot Study," USDA Forest Service, September 2003.

[75] USDA Forest Service News Release: FS-0406, February 20, 2004.

[76] http://www.blm.gov/nhp/efoia/wo/fy05/im2005-067.htm.

[77] For more information about grazing fees, see "Livestock Grazing: Federal Expenditures and Receipts Vary, Depending on the Agency and the Purpose of the Fee Charged." United States Government Accountability Office, September 2005.

Table 5.3: Animal Unit Months on The Carson NF, 1985-2002[78]

Year	AUM
1985	NA
1986	NA
1987	125,705
1988	116,799
1989	13,017
1990	NA
1991	119,983
1992	119,983
1993	126,171
1994	108,171
1995	106,036
1996	105,523
1997	110,094
1998	107,949
1999	162,638
2000	144,792
2001	155,245
2002	147,474
Carson Total	1,769,580

Source: USDA Grazing Database

One of the greatest concerns facing ranchers is the tendency for ranch land to be sold and subdivided rather than continuing as agricultural land. When farms and ranches located near the NF are no longer economically viable, ranchers may be more likely to sell or subdivide their land to developers and new-comers. It is usually the desire to preserve qualitative features (history, tradition, etc) that keeps ranchers from selling. Operators of small, traditional ranches rank quality of life above making a profit.[79] Beyond the lifestyles of the residents, open space around the forest may also be at risk if farms and ranches are not economically viable.[80]

5.3 Timber

Timber has long been a traditional use in the Carson NF, but is not a major commercial draw. **Table 5.4** shows the value of timber sales from 2000 to 2004. The "Sales" column shows the amount collected by the USAD FS for rights to harvest the forest, such as permits and other fees. The "Cut" column indicates how much was collected from the sales of the cut timber. The data show that cut timber brought in about $100,000 each year between 2000 and 2004.

[78] Note: Data obtained from forest-level hard copy records. Reliability of the data is unknown as only available records were utilized. Records may be missing for any given year. Cells with data missing indicate data is not available. Reliability of the data is unknown as only available records were utilized. Records may be missing for any given year.

[79] Raish, C., Yong, W. and Marzluff, J. (1997). "Contemporary Human Use of Southwestern Ponderosa Pine Forests." USDA Forest Service General Technical Report, RM-GTR-292.

[80] Jack Ward Thomas and Stephanie Lynn Gripke, "Maintaining Viable Farms and Ranches Adjacent to National Forests for Future of Wildlife and Open Space," *Rangelands* 24(1), 2002.

Table 5.4: Timber Sales on The Carson NF, 2000-2004

Year	Sales	Cut
2000	$90,475	$108,963
2001	$105,773	$114,347
2002	$82,755	$104,419
2003	$108,401	$111,780
2004	$108,202	$98,293
Carson Total	**$495,606**	**$537,801**

Source: USDA TIMS Database

According to the TIMS database, the most profitable forest product in 2004 was fuelwood, which accounts for about 85 percent (about $2 million) of the total timber cut value for 2004. This follows a trend common to other forests. For example, fuelwood accounted for 88 percent of the total 2004 timber cut value in the Cibola NF. The timber industry is not a major economic force in the area, nor does it provide many jobs, as Chapter 7 will show. **Table 5.5** shows the value of special products produced with forest timber resources.

Table 5.5: Non-Timber (Special) Product Activity on The Carson NF, 2004

Type	Cut Volume (MBF)	Sales Volume (MBF)	USFS Value	Price per MBF or Cord	Cut Value	Sold Value
Soft Sawtimber	40	59	$642	$397	$23,391	$23,391
Hard Sawtimber	36	42	$77	$425	$18,003	$18,003
Pine Pulpwood	0	0	$0	$62	$0	$0
Hard Pulpwood	0	0	$0	$62	$0	$0
Soft Poles	458	558	$24,065	$557	$310,382	$310,382
Hard Poles	29	5	$135	$557	$2,705	$2,705
Soft Posts	5	6	$830	$4	$24	$24
Hard Posts	14	10	$278	$4	$62	$44
Fuelwood	5,869	6,243	$52,968	$320	$1,877,926	$1,997,760
Misc. Convert	0	0	$65	$0	$0	$0
Christmas Trees	1,105	1,581	$7,930	$0	$0	$0
Misc. Not Convert	0	0	$0	$0	$0	$0
Transplant	0	0	$0	$0	$0	$0
Carson Total	**7,555**	**8,503**	**$86,990**	**$2,387**	$2,232,493	$2,352,308

Source: USDA Forest Service TIMS Database

5.4 Oil and Gas

Oil and natural gas development is the primary use of land on the Jicarilla RD, which lies in the Chama Municipality of Rio Arriba County. There are over 600 active oil wells on the district, as illustrated in **Figure 5.1**. Data show that many revenues produced by oil and gas development are not integrated back into the local economy. Although there is unlikely to be any significant economic impact directly from the extraction of oil and gas, the local region does receive benefit in the form of state and local taxes and FS tax disbursements for transportation and road costs. Chapter 7, **"Economic Impact,"** discusses oil and gas exploration in full detail.

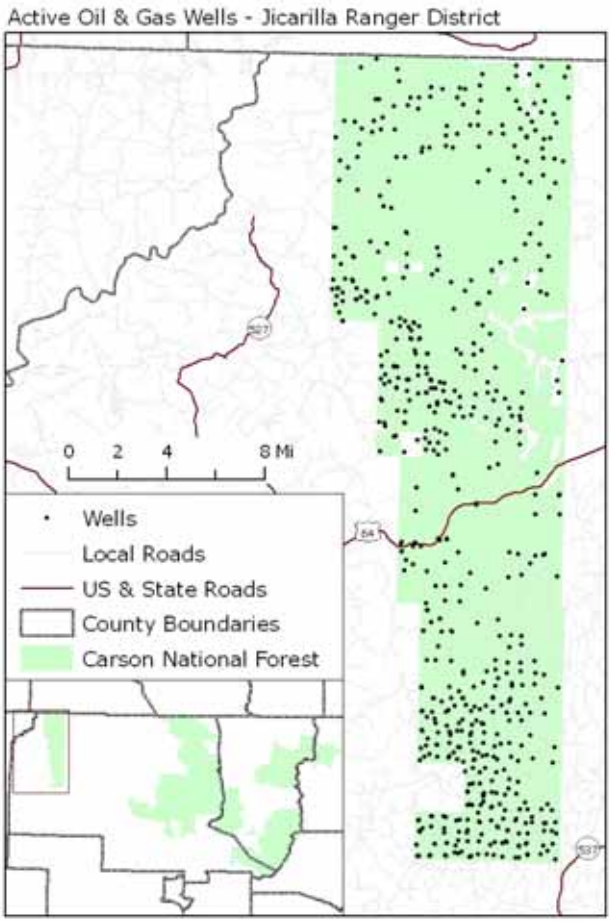

Figure 5.1: Active Oil and Gas Sites (Jicarilla RD)

Oil and gas development is already taking place in the Jicarilla RD, but mineral resource interests have pursued the possibility of mineral exploration in the Valle Vidal Unit on the Questa RD. The Valle Vidal Unit of the Questa RD is about 100,000 acres of undeveloped land that is currently a multiple-use area and is mostly used for recreation, such as hunting and camping.

5.5 Special Use Permits

The Carson NF sanctions the use of the NF lands by issuing special use permits. Permits authorize occupancy, usage, rights to and privileges on the forest lands. The permits allow for a wide range of activity on the forest as a whole, but each district is utilized for only a few purposes. Using special use data provided by the FS, **Table 5.6** shows that each RD appears to have a different concentration of special uses. Also reported below is the amount of "rent" collected for each permit category. Rent includes permit fees and other related charges.

Table 5.6: Special Use Permits on The Carson NF (1949-2005)

	Tres Piedras			Canjilon			El Rito		
Permit Category	**# Active**	**# Closed**	**Rent Total**	**# Active**	**# Closed**	**Rent Total**	**# Active**	**# Closed**	**Rent Total**
Recreation	8	10	$3,190	5	8	$720	1	0	$0
Agriculture	5	0	$182	-	-	-	1	0	$61
Community/Public Information	5	0	$0	3	0	$3,000	13	0	$0
Feasibility, Research, Training, Cultural Resources, & Historical	1	0	$0	1	0	$0	-	-	-
Industry	2	0	$0	0	1	$0	1	0	$0
Energy Generation/Transmission	2	0	$0	1	0	$0	5	0	$1,205
Transportation	16	0	$546	8	1	$61	10	0	$308
Communications	16	1	$7,768	2	0	$1,862	5	0	$1,409
Water (Non-Power Generating)	14	0	$61	13	0	$125	13	0	$121
TOTAL	**69**	**11**	**$11,746**	**33**	**10**	**$5,767**	**49**	**0**	**$3,104**

	Questa			Camino Real			Jicarilla		
Permit Category	**# Active**	**# Closed**	**Rent Total**	**# Active**	**# Closed**	**Rent Total**	**# Active**	**# Closed**	**Rent Total**
Recreation	60	21	$47,526	35	16	$21,272	11	2	$1,208
Agriculture	-	-	-	1	0	$61	3	0	$0
Community/Public Information	12	0	$182	5	0	$0	-	-	-
Feasibility, Research,Training, Cultural Resources, & Historical	1	0	$0	23	4	$549	3	0	$61
Industry	4	0	$61	3	0	$0	-	-	-
Energy Generation/Transmission	6	1	$0	5	0	$0	16	0	$0
Transportation	34	1	$1,645	22	1	$737	2	0	$0
Communications	10	0	$14,966	5	1	$1,687	1	0	$0
Water (Non-Power Generating)	29	0	$668	14	1	$364	3	0	$0
TOTAL	**156**	**23**	**$65,048**	**113**	**23**	**$24,670**	**39**	**2**	**$1,269**

Notes: 1). Permits Issued Encompass Those from 1952-2005. 2). The Number of Active Permits were calculated as "the number of issued minus the number of closed and revoked permits for each district."

Source: USDA Forest Service 2005 Special Use Permit Database (SUDS). Calculations by UNM-BBER..

The Questa RD, which has the most open permits, has the largest number of recreation permits. The Questa RD also collected the largest amount of rent ($65,048), with most coming from recreation permits. The Camino Real RD also has a high number of recreation-related permits, but it also has a significant number of cultural resources, such as the Pot Creek area. About forty percent of all recreation permits on the Carson NF are for guides and outfitters.

The largest number of permits in the Canjilon RD is for water-related uses, most likely on the lakes in the area. Most rent in the district, however, comes from the three community and public information permits. In the Jicarilla RD, the most common special permit is for energy generation and transmission, which are typically issued for gas pipelines and distribution lines.[81]

[81] Personal communication with FS staff.

5.6 Illegal Uses

Table 5.7 lists the most common violations on the Carson NF. In 2005, the FS recorded less than 60 violations in their LEIMARS[82] database. Illegally taking timber and forest products was the most common offense followed by general sanitation-related offenses.

Table 5.7: Violations on The Carson National Forest

Code	# Incidents	Violation Categories
36CFR261.6	17	Timber and other forest products (General Prohibitions)
36CFR261.11	11	Sanitation (General Prohibitions)
36CFR261.5	6	Fire (General Prohibition)
18USC111	4	General Prohibitions
36CFR261.56	4	Use of vehicles off National Forest System roads
36CFR2619A	3	Property
36CFR261.15	2	Admission, recreation use and special recreation permit fees
18USC1361	1	Government Property or Contracts
21USC844	1	Prohibited and Unlawful Acts
36CFR261.3	1	Interfering with a Forest Officer, volunteer, or human resource
18USC1855	1	Timber Set Afire
18USC641	1	Public Money, Property, or Records

Source: USDA Forest Service, LEIMARS, 2005

A focus group study exploring attitudes and values toward the Carson NF found that local residents perceive increased enforcement and education to be the best way to address several problems that can adversely affect forest resources and user experiences: growing vandalism, litter, off-trail riding by OHV and mountain biker riders, and tree and wildlife poaching. Many residents believe the problematic behavior is more common among visitors and recreational users, as they are not as invested in the well-being of the land.[83] The discussion of land use would not be complete without and in-depth examination of the land users themselves.

5.7 Forest Users

The history of the northern New Mexico region deeply influences how land is used and still shapes many of the current land-use issues. Changes in the economy have resulted in changes in who acts as the forest's stakeholders. Russell succinctly described how, in the past, the stakeholders were ranchers, farmers and extractive industries and now it is the recreation and tourism industries that have the most interest in forest land use.[84] This shift from traditional to recreational uses has also created a distinction between the types of users that access the forest.

There is a difference in usage between the area's newcomers and those whose families have been around for generations. Long-term residents have worked on the land and have sustained

[82] Law Enforcement and Investigations Management Attainment Reporting System.
[83] J. C. Russell and P. A. Adams-Russell (2005) Values, Attitudes and Beliefs Toward National Forest System Lands: The Carson National Forest. (Placerville, CA: USDA Forest Service, 2005).
[84] Ibid.

themselves for generations. As such, they often have a well-developed sense of attachment and entitlement to the land.[85] Newcomers are often perceived to not have the same land ethic and values about natural resources as do longer –term residents. Similarly, newcomers are often perceived as under-appreciating and not understanding some of the traditional uses, such as grazing. A humorous anecdote told by long-time ranchers described affluent newcomers as complaining about, "cows on their Kentucky blue grass lawns."[86] A difference also exists between resident 'locals' and non-local recreational users. It is common for residents to believe that non-local recreational users have less responsible values about forest resources than local residents. Non-local residents also demand more from the land and from the FS. As a respondent in Russell's study indicated,

Tourists expect more now than in the past. They want more activities in the mountains and more well-maintained trails. They want more facilities…. And more options to fish, hike, camp, drive jeeps and mountain bike and horseback ride and more… They want more than they ever have and it's going to put pressure on the Forest Service and the rest of us to manage it better.

From another perspective, many recreational users and environmental advocates often perceive the FS to give priority to traditional users as a way to avoid conflict. As an example, in a personal discussion with a Forest official, he explained, "as long as they can ranch, they won't say anything." According to some, traditional users use the land to do whatever they want without regard for anything or anyone else simply because they live there. [87]

While many forest users are hesitant to limit access of others, increasing attention is being given to how some users are degrading the land and the experiences of other users. This is especially true with the growth of unmanaged recreation and the popularization of OHVs.[88]

The use of OHVs is a hot topic among traditional and recreational users and is a major rallying point in the multiple use debate. The FS acknowledges that unmanaged recreation, namely OHV use, is one of the four largest threats facing the NF System. According to the FS, OHV ownership has grown from 5 million in 1972 to 36 million in 2002.[89] On November 2nd, 2005, the FS announced its Travel Management Rule concerning OHV recreation in National Forests and Grasslands.[90] New guidelines provide different strategies for combating the growing negative consequences of OHV use in the forests. The new rules went into effect on December 9, 2005.[91] Generally, these policy revisions call for the re-designation of trails and routes – including modifying FS maps to show which trails are designated for different types of uses. In the Questa

[85] Raish, C. and McSweeney, A. "Livestock Ranching and Traditional Culture in Northern New Mexico," *Natural Resources Journal*, vol. 41 (2001): 713.
[86] Ibid.
[87] J. C. Russell and P. A. Adams-Russell, Values, Attitudes and Beliefs Toward National Forest System Lands: The Carson National Forest. (Placerville, CA: USDA Forest Service, 2005).
[88] J. C. Russell and P. A. Adams-Russell, Values, Attitudes and Beliefs Toward National Forest System Lands: The Carson National Forest. (Placerville, CA: USDA Forest Service, 2005).
[89] US Forest Service, Four Threats - Questions and Answers, http://www.fs.fed.us/projects/four-threats/questions-answers.shtml.
[90] Final Rule for Motorized Recreation in National Forests & Grasslands. USDA Forest Service. http://www.fs.fed.us/news/2005/releases/11/travel-management.shtml.
[91] The Federal Register/vol. 70, No. 216/ Wednesday, November 9, 2005/Rules and Regulations, P. 68264, http://www.fs.fed.us/recreation/programs/ohv/final.pdf.

and Camino Real RDs, seven and eight miles of trails are currently designated specifically for OHV use, respectively. [92]

5.8 Challenges and Opportunities for Forest Management

Changes in land use often follow shifts in the economy. As principal economic activities shift focus from traditional (grazing, timber) activities to service-based (recreation, tourism), there is a resulting change in stakeholders. Previously, until the mid to late-20th century, stakeholders were the ranchers, farmers, loggers and others who worked to extract natural resources from the forest. Now and increasingly, recreation and tourist-based industries have a more vested interest in the decision making and planning of forest uses. Changes in land use also correspond to changes in forest management priorities. In the early part of the 1900s, a major objective of the FS was to manage resource development, whereas the priorities now include environmental and cultural preservation.

In debates regarding land use and especially special areas, there appears to be conflict over who has "more" rights to the land. While the forest is public land and everyone should have access, some believe they should have privileged status when it comes to forest planning and decision making. For instance, grazing interests in the El Rito RD are frustrated by the political pull of "non-local" environmental groups who do not have the level of knowledge and understanding of the land that the ranchers possess. Residents near the Questa RD may perceive large numbers of visitors as potentially harmful to the integrity of the area. Another example is Native American groups who identify with the area as their "homeland."[93] Some tribal groups perceive they have a permanent attachment to the land that is very different from other relationships. They do not consider themselves visitors to the forest, as they do not come from another place, and as such many feel that they should have an active and influential role in decision-making processes.

Another common complaint regarding the management of special areas is the perception that decisions are made without adequately inviting comments from the public or other interested parties. This has certainly been the case with land exchanges and tribal land use conflicts, even though the FS has formal procedures for inviting public comments.

In any decision or plan made by the FS, there is always the risk of upsetting individuals and groups who have differing agendas. Each type of user has different – often opposing -- expectations of the land, its use and of the FS. This puts the FS in a precarious situation, as the agency is seen as the arbiter of land uses. As with any management issue, the FS faces a number of opportunities and challenges.

While grazing is not the primary economic activity on the Carson NF, it is still one of the most culturally significant uses. Conflicts between ranchers and some conservation groups (among others) are causing the public and the FS to evaluate the impacts of grazing on public land. Those critical of current grazing practices (and even a few FS staff[94]), often argue that grazing causes soil compaction, reducing the absorption of rainfall and also the recharge of aquifers and water

[92] INFRA Trails Database, USDA Forest Service.
[93] INFRA Trails Database, USDA Forest Service.
[94] See Letter to Editor by ex FS Biologist Leon Fager in *Albuquerque Journal* July 10, 1998.

tables.[95] Others will argue that grazing allows livestock to trample much of the overgrown brush that has become such a fire danger.

Ranching interests often perceive environmental groups (and other interests) as 'non-local' entities who do not understand the land and its condition as much as those who depend on it for their livelihood. Traditional users often have a sense of entitlement to the use of forest resources because of traditional and long-standing ties to the land and agreements with the FS.[96] Further, they are often critical of FS plans, and believe the agency is letting the political agenda of a few drive decisions that will have long term effects, and only for short term gain. Rather, the residents believe that their traditional use has resulted in a body of knowledge and beliefs about forest conditions and health, which is better suited to inform decision making.

When considering land use plans and policy decisions, the FS has the opportunity to mediate the interests and activities of the "new" stakeholders and traditional stakeholders. One way, which was described in two of Russell's ethnographies, is to engage folk knowledge. Moving beyond a formal public input session, which many believe are just lip-service and serve no meaningful function, FS managers can move from "collecting" public input to "engaging" public input. As a later chapter will show, collaborative efforts between the FS and others are a crucial way of conducting business and implementing projects. Changing common perceptions and making others believe that they have a meaningful and effective voice in policy making can cultivate collaboration.

With all policy actions, the FS runs the risk of alienating some user groups while addressing the needs of others. Moreover, the FS runs the risk of losing the trust of local communities as effective land managers.

[95] It can also be argued that mountain-biking and other recreational uses can also cause soil compaction and other damage.

[96] J. C. Russell and P. A. Adams-Russell, Values, Attitudes and Beliefs Toward National Forest System Lands: The Carson National Forest. (Placerville, CA: USDA Forest Service, 2005).

6 Special Areas

This chapter describes special areas on the Carson NF, including recreational sites, Inventoried Roadless Areas (IRAs) and Wilderness areas. Special management areas are designed to protect fragile ecosystems, minimize human impact and preserve cultural significance of areas used for traditional purposes. **Figure 6.1** depicts the primary special management areas on the Carson NF, which are described in the following sections.

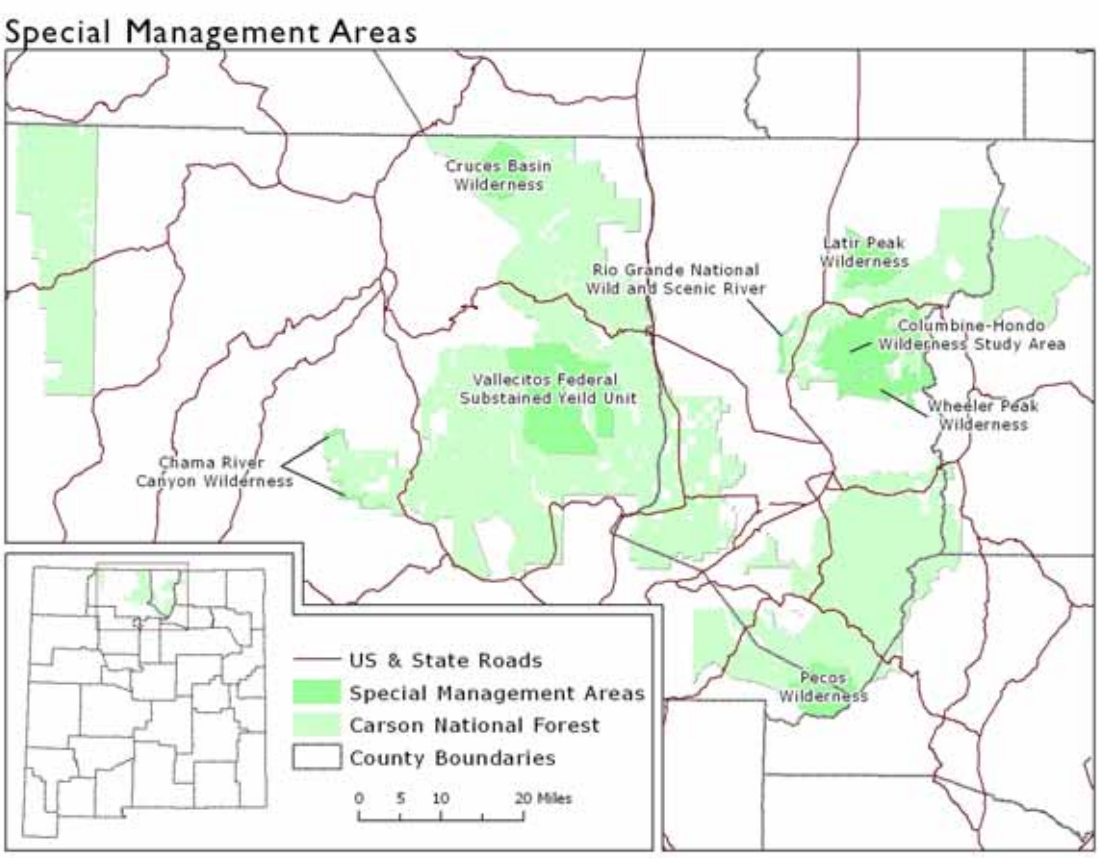

Figure 6.1: Special Management Areas on The Carson NF

6.1 Recreational Sites

The Carson NF features over 80 designated recreational sites. For a complete list of recreational sites, please see **Table A.4** in the appendix. **Table 6.1** lists the number of designated recreation sites in each district, according to the INFRA database. The Questa RD has the most recreational sites with 35 out of 81. The district also has two of the three ski areas, which attracts the most visitors. Other common sites are developed campgrounds (28) and trailheads (27).

Table 6.1: Recreation Site Type in The Carson NF

Designated Site Category	Number of Sites					
	Tres Piedras	El Rito	Questa	Camino Real	Unknown	Total
Picnic Site	1	0	2	3	3	9
Campground	3	1	14	8	2	28
Interpretive Site (Major)	0	0	0	0	1	1
Trailhead	0	0	11	15	1	27
Camping Area	1	1	1	1	0	4
Day Use Area	0	0	1	1	0	2
Ski Area Alpine	0	0	2	1	0	3
Group Picnic Area	0	0	1	0	0	1
Other Winter Sports Site	0	0	2	1	0	3
Fishing Site	0	0	1	0	0	1
Interpretive Site (Minor)	0	0	0	1	0	1
Group Campground	0	0	0	1	0	1
TOTAL	**5**	**2**	**35**	**32**	**7**	**81**

Recreational sites are classified as either developed or dispersed sites. A developed site is a discrete place containing a concentration of facilities and services used to provide recreation opportunities to the public. Recreation sites are developed within different outdoor settings to facilitate desired recreational use. Developed sites include campgrounds, picnic areas, shooting ranges, visitor centers, and historic sites. Dispersed recreation are activities that occur outside of developed recreation sites such as boating, hunting, fishing, hiking, and biking. In other words, dispersed sites are popular areas that have no facilities or services. **Figure 6.2** shows the approximate location of developed and dispersed recreational sites in the Carson NF.[97]

[97] Data was obtained from USDA Forest Service INFRA database. The data was unclear as to which sites were developed and dispersed, so the map shows approximations.

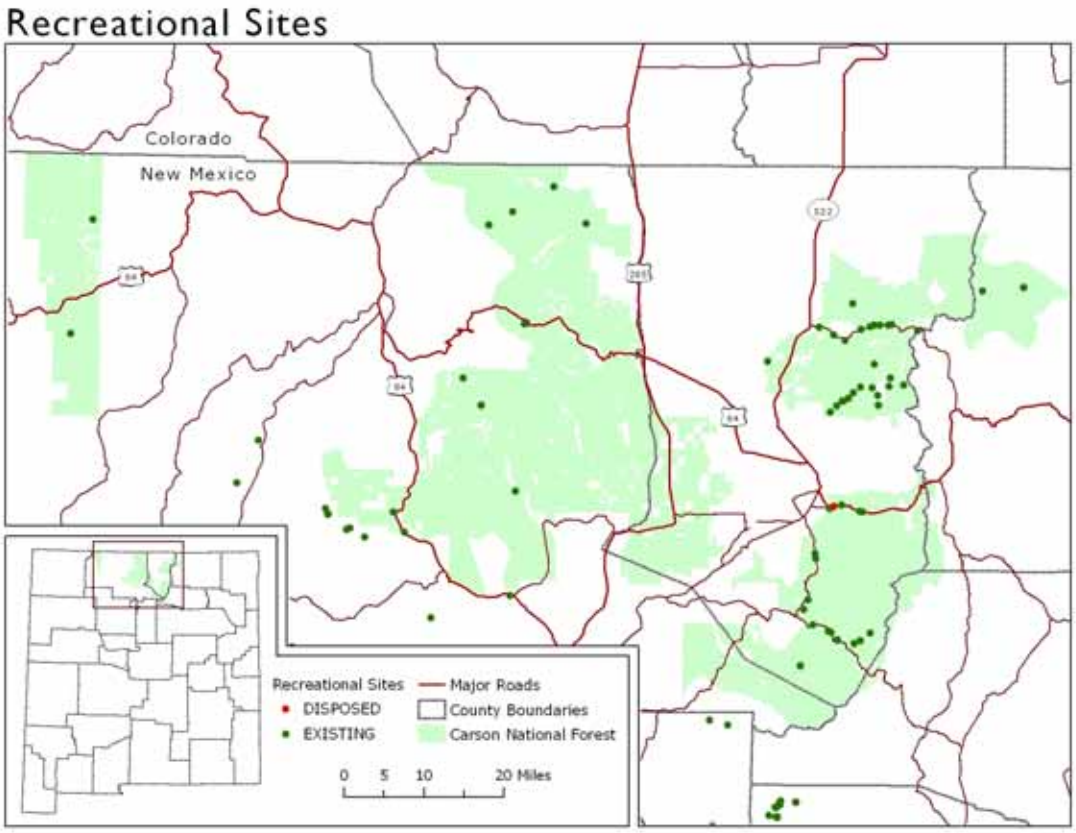

Figure 6.2: Designated Recreational Sites

6.2 Inventoried Roadless Areas and Wilderness Areas

In January 2001, the Clinton administration enacted the Roadless Area Conservation Rule ("The Roadless Rule"), closing off approximately 58.5 million acres of wild NF land to most commercial logging and road building.[98] In July 2004, the Bush administration announced a plan that would modify the Roadless Rule to create a petition process for governors who want to keep the areas protected or keep them open for various development endeavors. Generally speaking, universal protections for the IRAs are weakened.

Critics argue that the bureaucratic requirements involved in the petition process provide little incentive for governors to participate, which may result in the opening of IRA lands to commercial interests.[99] Supporters of the plan argue that roads allow access necessary for firefighters and offer additional recreational opportunities. Further, closing the areas off to development inhibits the economic viabilities for communities that depend on the forest for economic activity.

While the policy revisions are applicable to the whole nation, the conflict is heated in New Mexico. The state has 1,102,000 acres of IRA (that do not allow road construction or

[98] NM PIRG Education Fund.
[99] Ibid.

reconstruction), making up about 12% of the NF System land in the state.[100] New Mexico Governor Bill Richardson, a member of Clinton's Cabinet, called the new plan "an abdication of federal responsibility" and a “partisan move just months before the presidential election.” Richardson said he will petition to protect "every single inch" of roadless areas in New Mexico.[101] The IRAs are a political hot button; an example of how forest users have interests that are often at odds with each other. The political struggle can be minimized by referring to it as a “passing issue;” one that may not be present in the future. While this may be true, it is nonetheless indicative of major land use conflicts occurring among forest users and various levels of governments, which may be of concern for years to come. See **Figure 6.3** for a depiction of IRAs in the Carson NF.

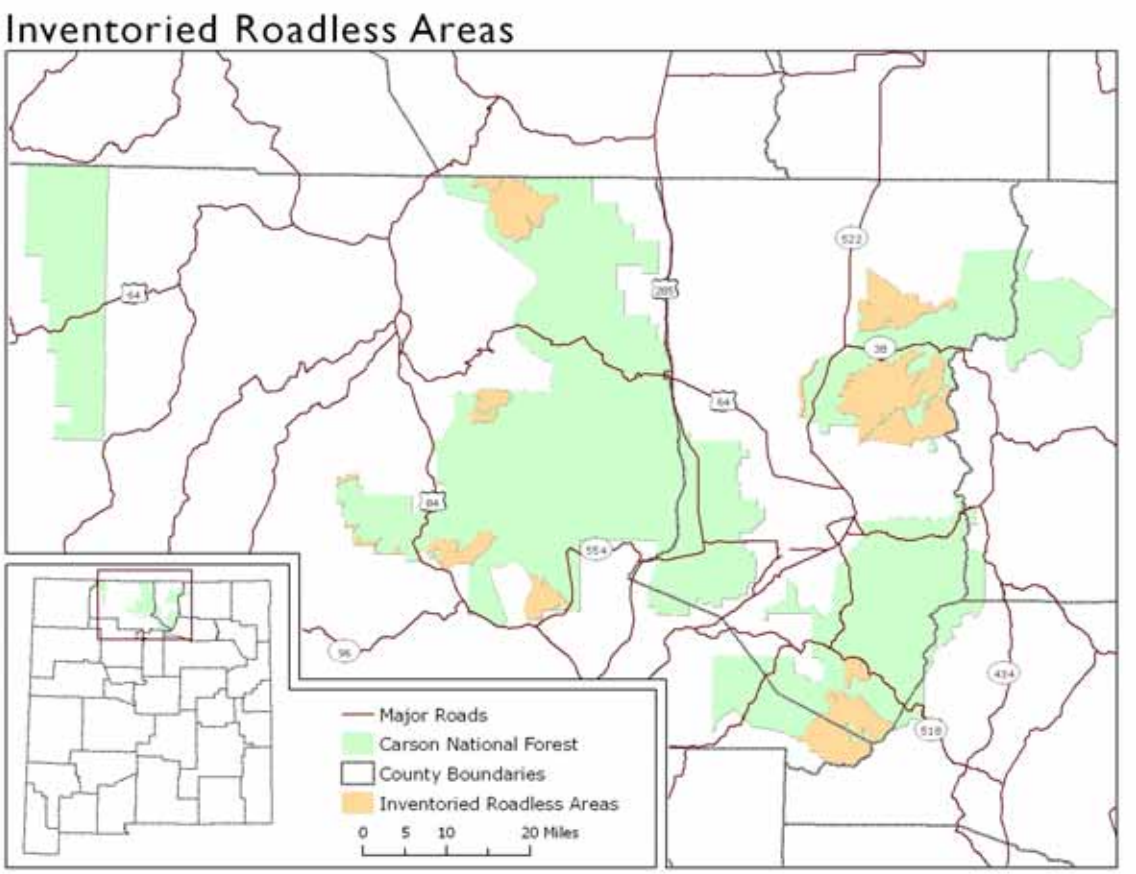

Figure 6.3: Inventoried Roadless Areas on The Carson NF

The map shows that much of the roadless areas are in designated wilderness areas, such as the Cruces Basin in the north-central region and the Wheeler Peak Wilderness in the eastern region. According to the FS, the Carson NF has 57,000 acres that are designated roadless and does not allow for road construction and reconstruction.[102]

[100] USDA Forest Service map of NM Inventoried Roadless Areas on NF lands.
[101] Juliet Eilperin, “Roadless Rules for Forests Set Aside: USDA Plans to Reverse Clinton Prohibitions,” *Washington Post*, July 13, 2004, A1.
[102] A Forest Service map of Inventoried Roadless Areas is available at http://roadless.fs.fed.us/states/nm/cars.pdf.

Wilderness is another special management designation, used to characterized areas where humans are only guests and the areas are generally unfettered by human development. Nationwide, wilderness areas were established through the Wilderness Act of 1964. The Act describes wilderness as *"an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain."* [103] According to the FS, the areas are part of a system of wild lands that contribute significantly to the ecological, educational, and social health of its users and surrounding communities. Wilderness provides clean air and water, a shelter for endangered species, sacred places for indigenous peoples, and a living laboratory for research. Beyond community benefits, the wilderness areas provide individual resources, such as an opportunity to explore personal values while experiencing risk, reward, and self-reliance.[104]

Within the Carson NF are 86,193 acres of wilderness. Wilderness is a formal designation, introducing restrictions such as: no mechanized travel (including bicycles) and no camping within 300 feet of wilderness lakes. The wilderness areas are: Wheeler Peak, Latir Peak, Cruces Basin and parts of the Chama River and Pecos Wilderness areas.

In addition to the IRAs and designated Wilderness areas, the Carson NF features a wild and scenic river. In 1968, Congress passed the National Wild and Scenic River Act, providing to protect certain rivers to remain in their natural state. Of the initially eight wild and scenic rivers, one lay in New Mexico, the Upper Rio Grande. The designated area begins at the Colorado border, this section of the river flows south through rugged country, skirting the Carson NF and the Pueblo de Taos Reservation for almost 50 miles to the town of Taos. This stretch of water adds to the recreational attractions offered by the facilities of the Carson NF, Wheeler Peak and the ski and hiking properties of the Red River resort.

As eluded to in previous sections, special management areas are invaluable to the FS and the forest users. They provide opportunities such as wildlife watching, exploration and retreating from daily life. These areas offer “unspoilt” landscapes and environments, treasured by forest users. The Valle Vidal Unit is the quintessential example of a multiple-use special management area. The next section details management and multiple use issues concerning the Valle Vidal Unit. While the discussion is specific to issues of a certain time, the unit is an integral part of the forest and discussions surrounding its use will carry on well into the future.

6.3 Forest-Specific Issues: The Valle Vidal Unit

Pennzoil gave the Valle Vidal Unit to the American people in 1982. The Valle Vidal is an area featuring abundant wildlife, including mule deer, black bear, mountain lion, wild turkeys, and native Rio Grande Cutthroat Trout. The area is also known for the state’s premier elk herds, which live in the vast alpine meadows. In 2002, the Carson NF received a request from El Paso Corporation to lease approximately 40,000 acres of the Valle Vidal for natural gas development. [105] Before the Carson NF can consent to the lease, a Land Management Plan amendment and leasing analysis must be completed. The Land Management Plan amendment process began in 2005 and should be completed some time in 2007.

[103] The Wilderness Society, *The Wilderness Act of 1964.* http://www.wilderness.org/OurIssues/Wilderness/act.cfm.
[104] Ibid.
[105] Reese, A. (2006). “Company’s Plans to Drill Near Contested Lands in NM Provokes Backlash,” Spotlight, Vol. 10 (9).

To the east of the unit is Vermejo Park Ranch. The El Paso Corporation plans to drill 25 new wells along the northeast edge of Vermejo Park Ranch, just across the ridge from the Valle Vidal. Further, the company is still requesting the FS to open the 40,000-acre eastern half of the unit for natural gas development. The company has consistently insisted that it can drill in an environmentally sensitive way. However, political leaders and community representatives have advocated the protection of the area[106] with the Valle Vidal Protection Act of 2005. In November 2006, U.S. Senator Pete Domenici announced his support for the bill, thereby constituting a congressional delegation unified in preventing development in the area.[107] Some argue that the decision to close the area to development is being guided by politics rather than sound scientific research and should have been made after the FS releases its Management Plan.

The effort to close the area to oil and gas development is led by the Coalition for the Valle Vidal.[108] The coalition is made up of sportsmen, ranchers, outfitters and guides, local businesses, elected officials, concerned citizens, outdoor enthusiasts, and conservation groups. The broad-based nature of the Coalition reflects a diverse spectrum of interests the have united in opposition to developing the Valle Vidal. Interests that have been historically in opposition, such as hunters and wildlife preservationists, are now bedfellows in an effort to keep the area from being developed.

The possibility of developing the Unit has stakeholders investigating development's potential effects on the local economies, communities and the natural environment. A study predicting the local economic impacts of natural gas development in the Valle Vidal region concludes that the committing the land to commercial mineral development will not bring real economic development to Colfax County. Some research shows that the area will be "condemned" to a "boom, bust and systematic decline that characterizes other mineral-dependent regions."[109] Beyond economic considerations, some, including former NM Attorney General Patricia Madrid, have expressed opposition to oil and gas development because of the area's ecological and social significance to the people of New Mexico. Further, the State of New Mexico Environment Department is concerned about adverse impacts of oil and gas exploration on surface water quality, non-point surface pollution and ground water quality.[110]

In addition to the concerns raised by state agencies and public officials, an analysis of public comments showed the vast majority of people who wrote letters to the FS expressed the desire to protect the Valle Vidal from development (97% of 54,029 letters).[111]

The Valle Vidal Unit is an undeniable force in the socio-economic vitality in northern New Mexico. Whether the area is developed for natural gas extraction or not has caught the attention of residents and political leaders from all around the state and the rest of the nation. It is a prime example of the interactions between the FS, other federal entities, political leaders, private interests, and forest users all jockeying for what they believe to be the best use of land. While this

[106]Coleman, M. "Udall Wants Ban on Mineral Extraction in Popular Valle Vidal Recreation Area," *Albuquerque Journal*, October 28, 2005.
[107] The Associated Press. "Domenici Joins Rest of NM Delegation on Valle Vidal Bill," November 17, 2006.
[108] See, http://www.vallevidal.org/.
[109] Power, M. (2004). The Local Economic Impacts of Natural Gas Development in Valle Vidal, New Mexico.
[110] Ibid.
[111] Hughes, T. (2006). Quantitative Analyses of Public Comment Submitted During the Scoping Phase of the Proposed Forest Plan Amendment for the Valle Vidal.

issue may be resolved in 2007, one can expect to hear more about the Valle Vidal and other special management areas in the future.

6.4 Tribal and Ceremonial Areas

Northern NM is characterized by the presence of tribal lands, including reservations and pueblos. However, tribes have historically used land inside and outside these formal designations. Much of the forest encompasses or abuts areas that were inhabited by native tribes for hundreds of years. Research with northern New Mexico tribes has described the areas including and surrounding forest boundaries are part of the tribes' "homeland."[112] The concept of Homeland, as used by tribal groups, can be described as the interaction of tribal association with traditional lands, history, and culture. While homeland identifies a specific geographic locality that can be seen on a map, homeland also describes contemporary tribes and their long-standing connections to their ancestors and history.[113] The tribal homeland existed long before formal designations such as "Indian Territory" or "Reservation," came into play, although there is some overlap. Homeland extends across formal boundaries and includes qualitative understanding about the connections of place, culture and ways of life that links past and future generations.

While these considerations are no doubt broad and vague, they are of the utmost importance to the tribal groups and their way of life. For these locales, the identity and other information are kept secret to honor the privacy of tribal activities and uses. Information is not provided to visitors on brochures or maps, nor is it shared freely among local communities. However, the FS does maintain information on areas such as "heritage resources," which often include these special areas. The low-profile of sacred areas poses a unique problem to the FS, as it prevents them from knowing which areas are considered sacred. For instance, imagine a hypothetical situation where a proposed road intersects an area of cultural import, but the tribe does not wish to comment because the site would then be identified. Management approaches to protecting cultural sites may be counter-productive because they have the potential to identify sites.[114] Further, the various tribes have different areas which they use for ceremonial and cultural purposes. One tribal group may think FS management in the area is a great idea while another tribe wants the area completely protected.[115] The implication is that the FS would have to consult with each tribe individually on management decisions.

The tribes' long-term association with the landscape has resulted in the accumulation of knowledge about ecological processes, weather and the relationships of humans to the landscape. This accumulated traditional knowledge is perceived to be undervalued and misunderstood by the FS, and there is a desire to foster appreciation and use of this information in future management and decision-making.

6.5 Challenges and Opportunities for Forest Management

The Forest Service maintains special areas in the forest that offer unique opportunities for visitors, traditional forest users and wildlife. The key issues concerning special management areas

[112] Russell, J. and Peggy Adams-Russel, P. (1995) Attitudes, Values and Beliefs toward National Foest Service Land: The NM Tribal People. USDA Forest Service.
[113] Ibid. p. 31.
[114] Ibid.
[115] Ibid p.30.

are similar to those presented in Chapter 5. The FS is in the difficult position of mediating different, often opposing, perspectives on what is the best and most appropriate use of land. In basic terms, one can see the line drawn between supporters of the FS's old mission, which was to extract economically viable resources from the forests and the more contemporary mission: conserve and protect the forest for generations to come. In some cases, like the Valle Vidal, the disagreements often grow into something bigger than just a land use decision. Rather, it becomes a symbolic rallying point for the forest's various stakeholders, making the FS's duties even more difficult.

With growing population pressures and increasing conflicts between government bureaucracy and forest users, the management of special areas promises to become more complicated. As stated in the Wilderness Act of 1964, *...increasing population, accompanied by expanding settlement and growing mechanization,"* [the Act helps to] *"secure for the American people of present and future generations the benefits of an enduring resource of wilderness."*

Opportunities exist for the FS in regards of managing special areas. The substantial public response to forest management issues demonstrates that various stakeholders are deeply invested in land use decisions and look to the FS for support. Here again, the FS has the opportunity to demonstrate its mission, facilitate discussion and create collaborative relationships among different stakeholders. The tribal groups in the area pose a special management opportunity.

Northern New Mexico is home to many tribal groups, each representing a potential source of knowledge and management assistance, which can be of tremendous benefit to the FS. Russell's study on the northern tribes revealed a willingness among tribal members to be involved in forest management and decision-making processes. The FS has the opportunity to directly address tribal interests in management decisions by delegating some of the management responsibilities to the tribes.

In terms of further developing forest land, such as road construction, the FS has the opportunity to increase visitor access to the forest and maintain adequate access routes for emergency personnel. In many cases, allowing development can possibly increase much needed economic activity in rural areas, as in the case of mineral extraction. Again, the difficulty lies in balancing land use among a broad spectrum of stakeholders.

Special areas pose many risks and challenges to the FS as well. In regards to recreational sites, maintaining them requires significant amounts of labor and other resources that may not be available to the FS. In the past, the agency has addressed this issue with the use of volunteers.

The FS is often caught in the middle of decision making at the federal level (such as the Roadless Rule) and demands from users at the local level. If locals perceive the federal government as interfering with New Mexico land issues, the FS can be accused of being influenced by "Washington" and not being sensitive to the cultural and ecological contexts of open space in New Mexico. Any decision the FS makes runs the risk of upsetting another group of stakeholders.

When working with tribal groups, the FS is in a complicated situation. As described earlier, there are about ten tribal groups surrounding the Carson NF. To each of these groups, the land is the nexus of history, way of life, culture and future generations. Special areas are used for religious and cultural purposes, and these places are not always known by the FS. This complicates forest management because the agency runs the risk of implementing projects on ceremonial land without knowing it. Further, the tribes all use different special areas. One tribe may give the go ahead to clear trees from one area, when another tribe uses it for ritual practices. The only way to

be completely sure is to survey all the tribes individually. The FS works to preserve the integrity of tribal special areas, but it becomes very difficult when they do not know where they are.